THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXIII. No. 1865.] LONDON, FEBRUARY 7, 1899. [51ST YEAR. PRICE 6d.

WELDON MUD
FOR
GAS PURIFICATION,
For use in the
RECOVERY OF SULPHUR,
ALSO
Removal of last Traces of SULPHURETTED HYDROGEN in catch position.

Full Particulars on application to the Patentees:
GAS DESULPHURIZATION CO.,
— LIMITED, —
1, FENCHURCH AVENUE, LONDON, E.C.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER.
GAS ENGINEERS' AGENTS AND CONTRACTORS FOR
Meters, Fire-Clay Goods, Oxide of Iron, and all other Gas Apparatus. Retort Carbon purchased.
Inquiries Solicited.
Telegrams: "DARWINIAN, MANCHESTER." Telephone 1806.

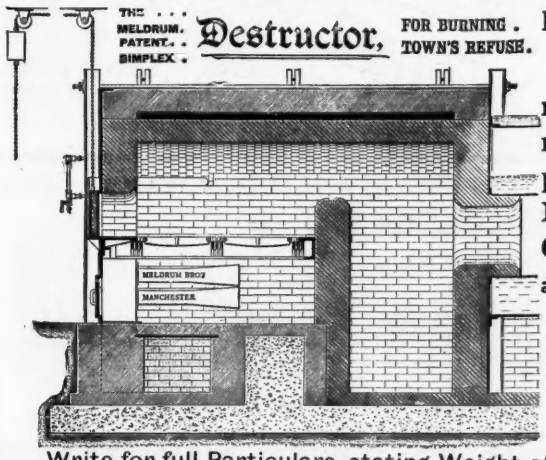
JAMES OAKES & CO.
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts and Covers, and rendering Leakage impossible.

PARKER & LESTER,
Manufacturers & Contractors.
GAS-LEAK INDICATOR.
For Particulars and Price apply to
ORMSIDE STREET, LONDON, S.E.
ESTABLISHED 1830.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.
Prices and Analysis of all the Scotch Cannels on Application.

NORTON'S PATENT
"ABYSSINIAN" & ARTESIAN TUBE WELLS,
FOR TOWN WATER-WORKS AND OTHER SUPPLIES.
The following Town Water-Works Supplies have been obtained by this System, viz.:—Abbott's Langley, Aldershot, Alnwick, Cirencester, Hertford Lechlade, St. Albans, Shrewsbury, Skegness, Southampton, Stony Stratford, Swansea, Wallingford, Watford, West Worthing, Wimborne, &c.
LE GRAND & SUTCLIFF,
HYDRAULIC ENGINEERS, 100, BUNHILL ROW, LONDON, E.C.

THE Utilization of Towns' Refuse for some practical purpose has been successfully solved; and there is, therefore, no reason why every township should not have its own Electric Light Installation, and obtain all the power from its Dust-Bins.



At Hereford City the Sewage Farm is now worked entirely with power from refuse, 1¼ million gallons being pumped per day, besides Sludge-Presses, Sludge-Pumps, and Lime-Mixers—the saving in Cost of Coal (not now used) being about £300 per annum.

AN INSTALLATION ON SIMILAR LINES NOW ON ORDER FOR HUNSTANTON WATER-WORKS.

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(ESTABLISHED 1765).

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Wrought-Iron Roofs, Bridges, Girders, &c.,

Steam, Hot Water, and Range Boilers, Tanks, Cisterns, Boats, and all kinds of Wrought-Iron Work.

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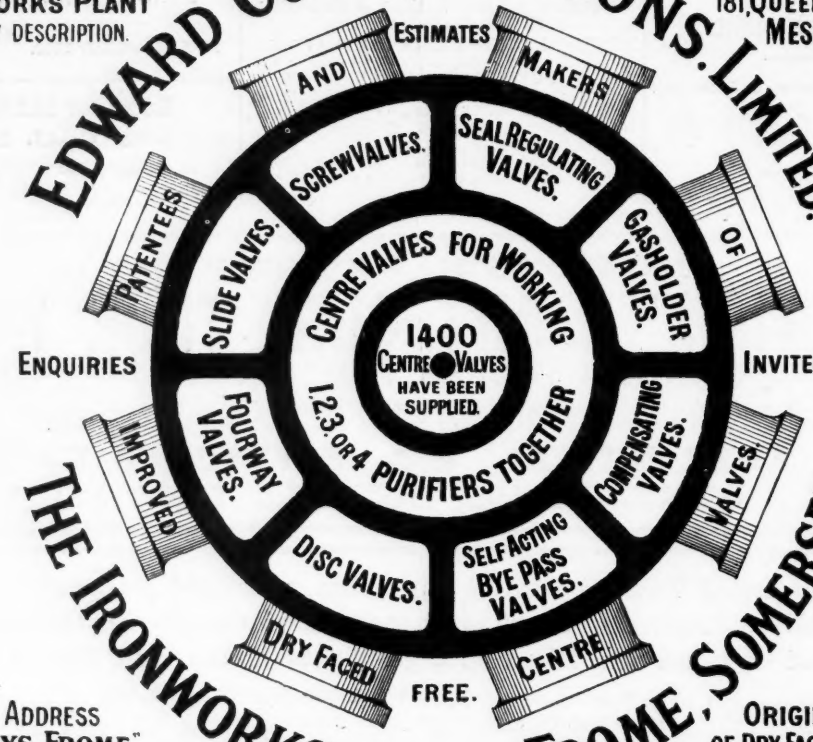

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PATENT COMBINED BYE-PASS & COMPENSATOR FOR EXHAUSTERS.

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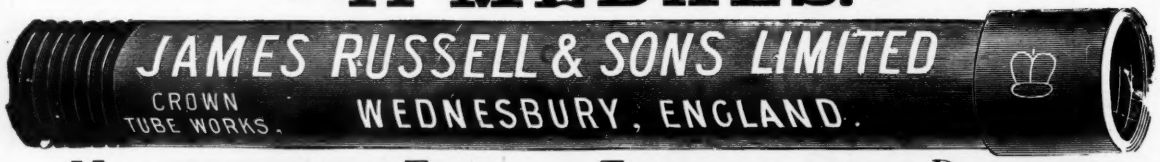

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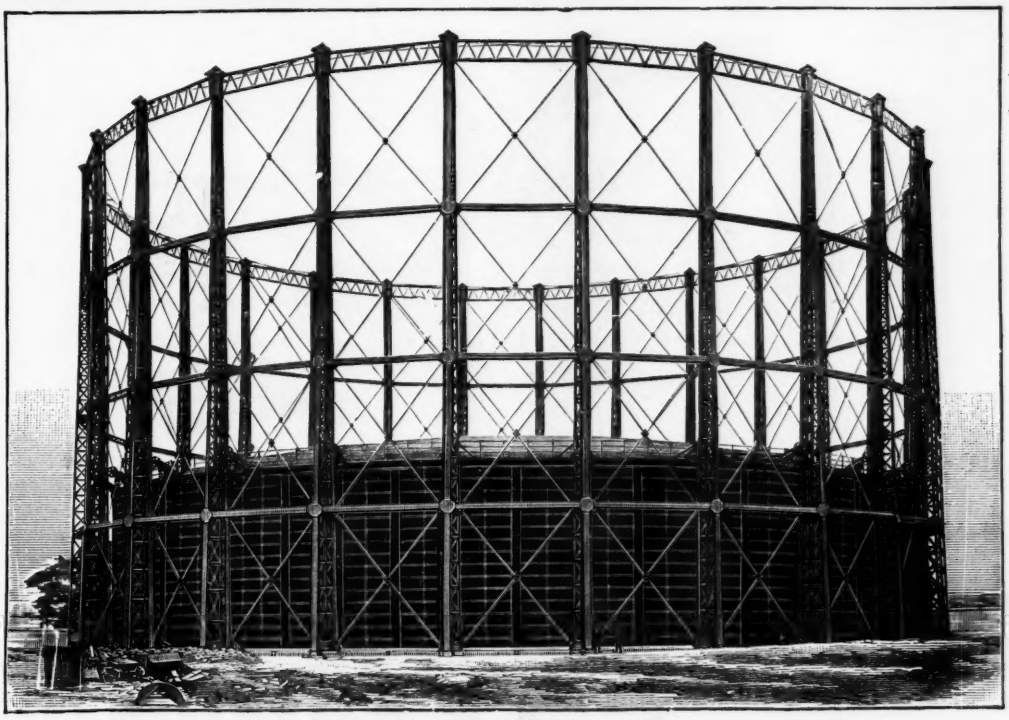

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London District Office: 6, STRAND, LONDON—C. PARKER & SON, Sole Agents.

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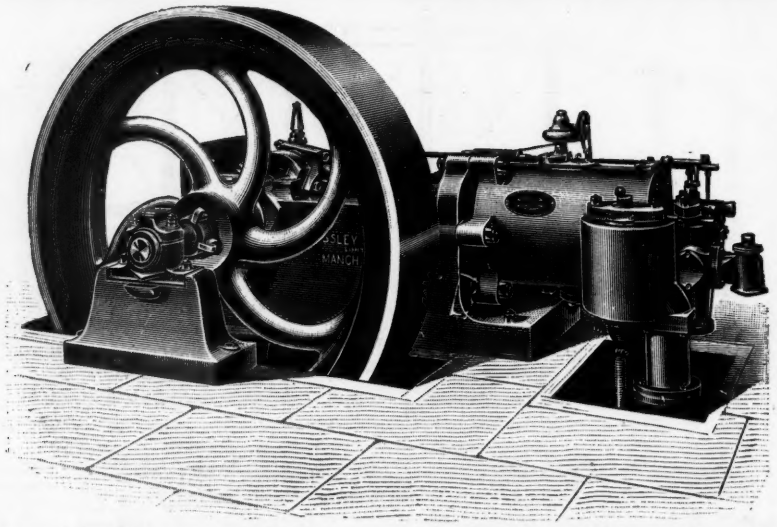

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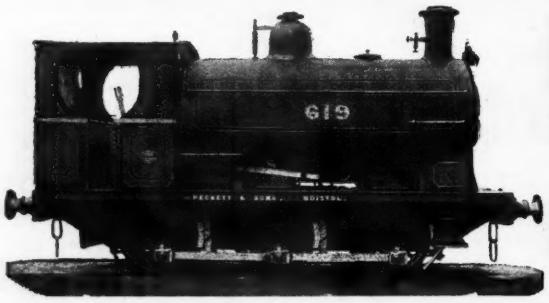

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Improved COAL and COKE HANDLING PLANT, CONVEYORS, and ELEVATORS,

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NEW WELSBACH BURNERS.

25 Candles per Cubic Foot of Gas.

This is the Burner exhibited at Niagara Hall, London, and throughout the Provinces.

The New Welsbach Burner is used without a Chimney.

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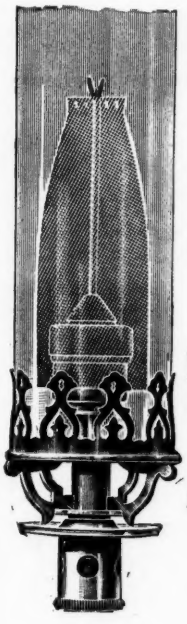
MANTLES from 9d. each.



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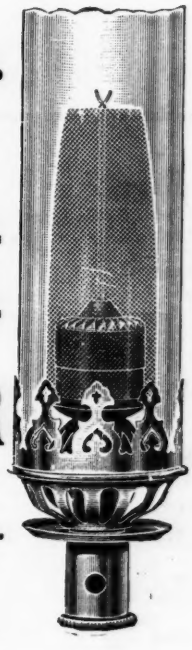

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A CHEAP FORM OF THE "C" BURNER.
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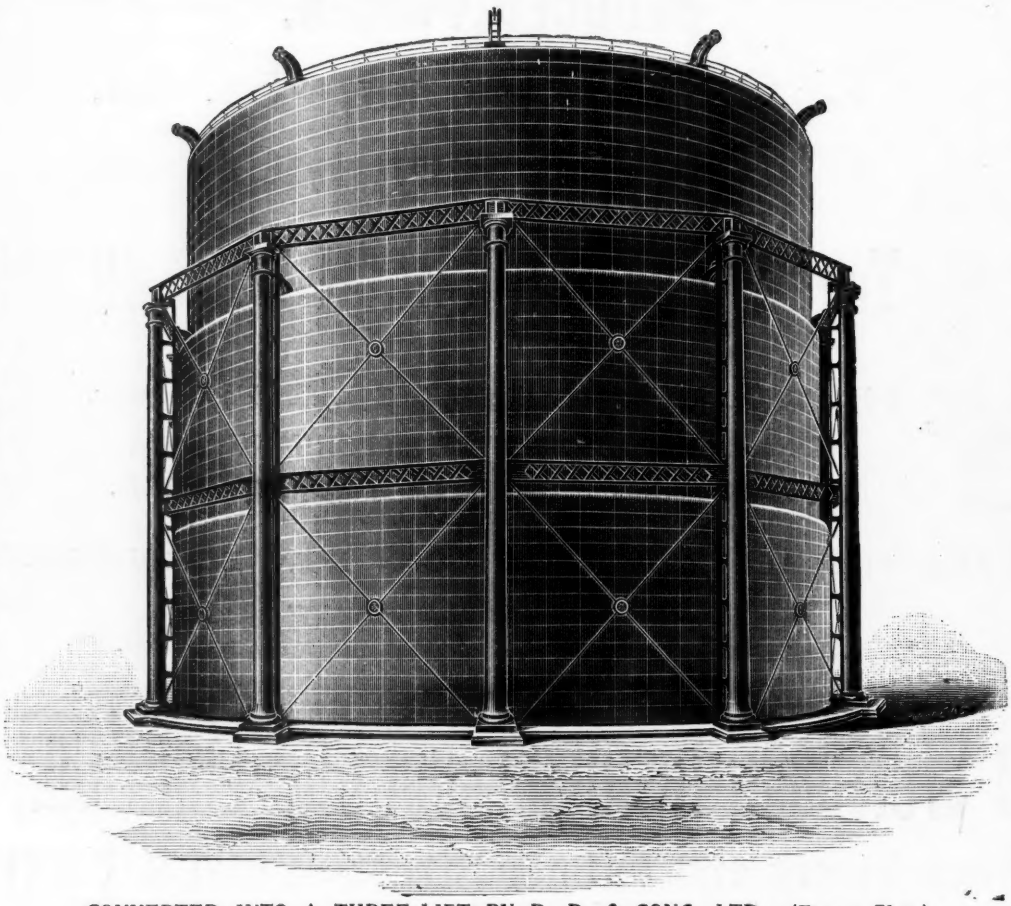

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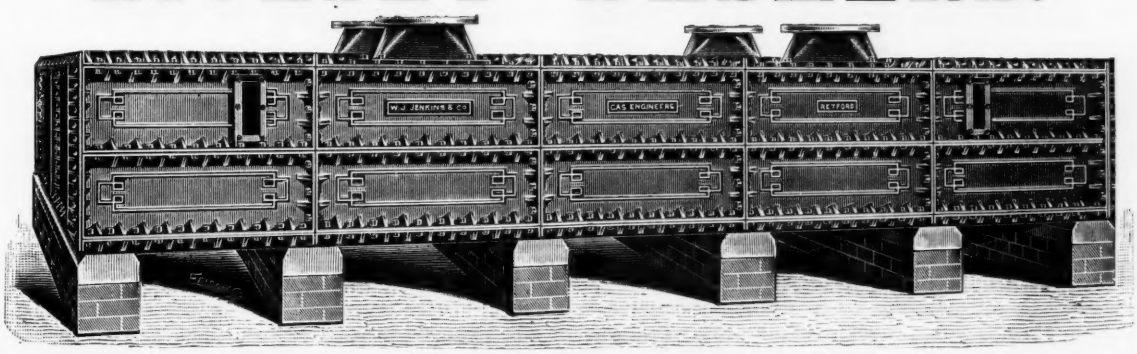

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FIRE-BRICKS of the highest Quality, made from Fire-Clay of a most Superior and Refractory Character, suitable for **GLASS-WORKS, GAS-WORKS, and BLAST-FURNACES.**

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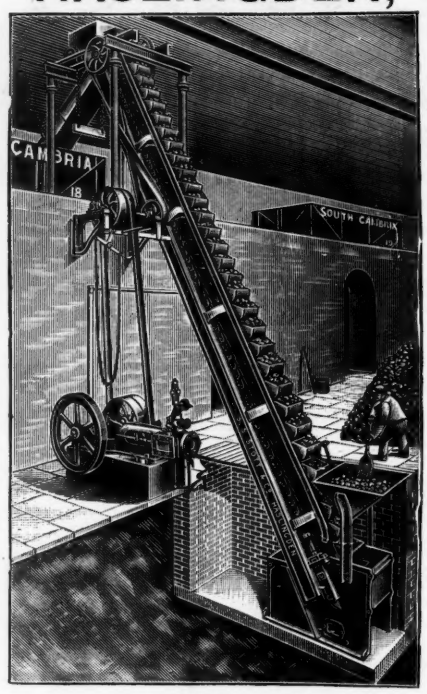

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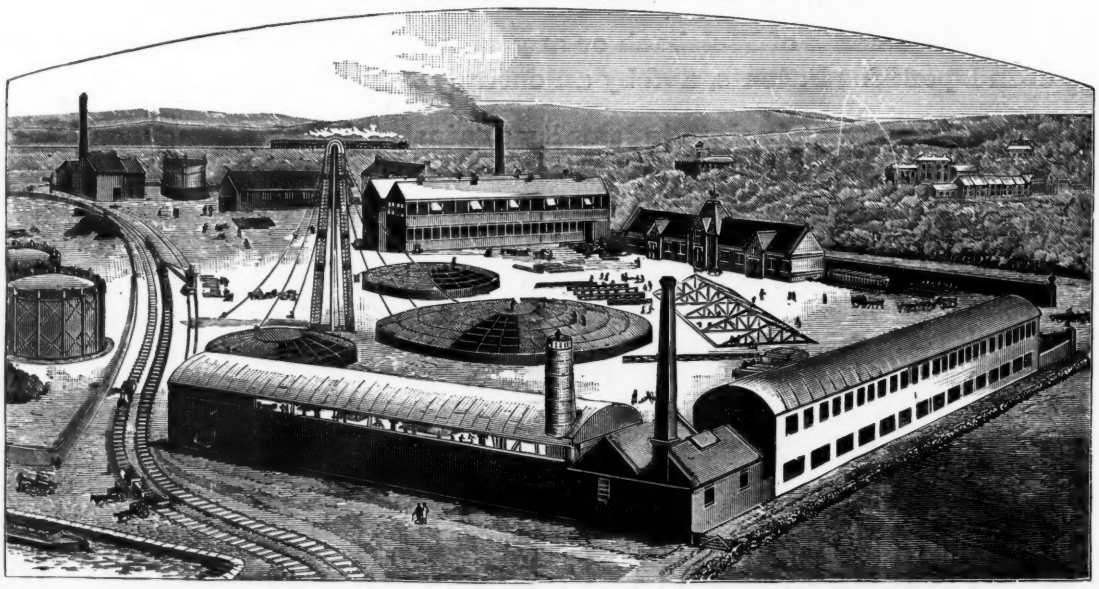

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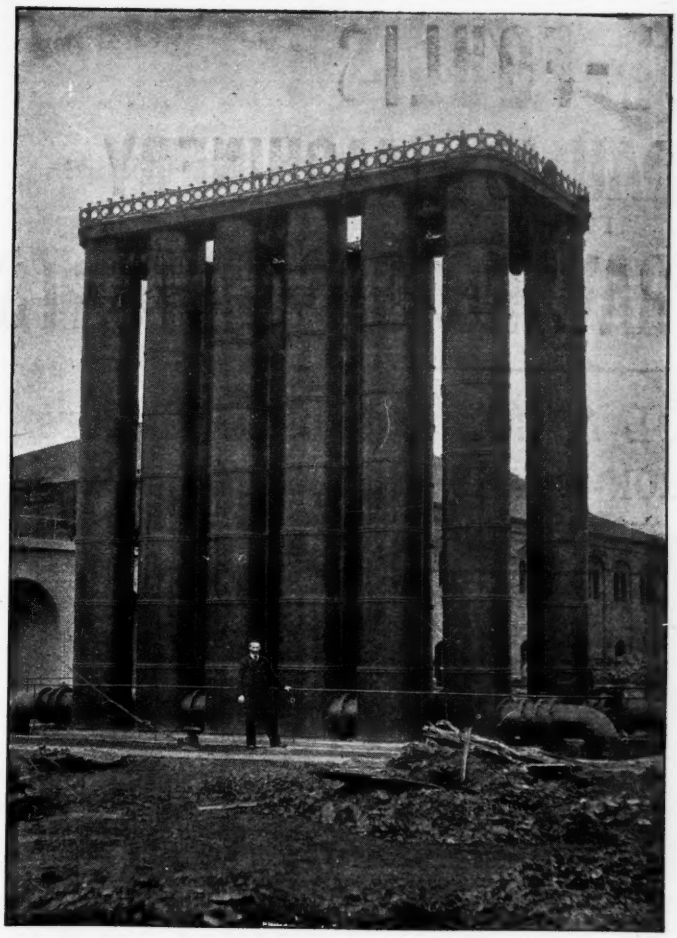

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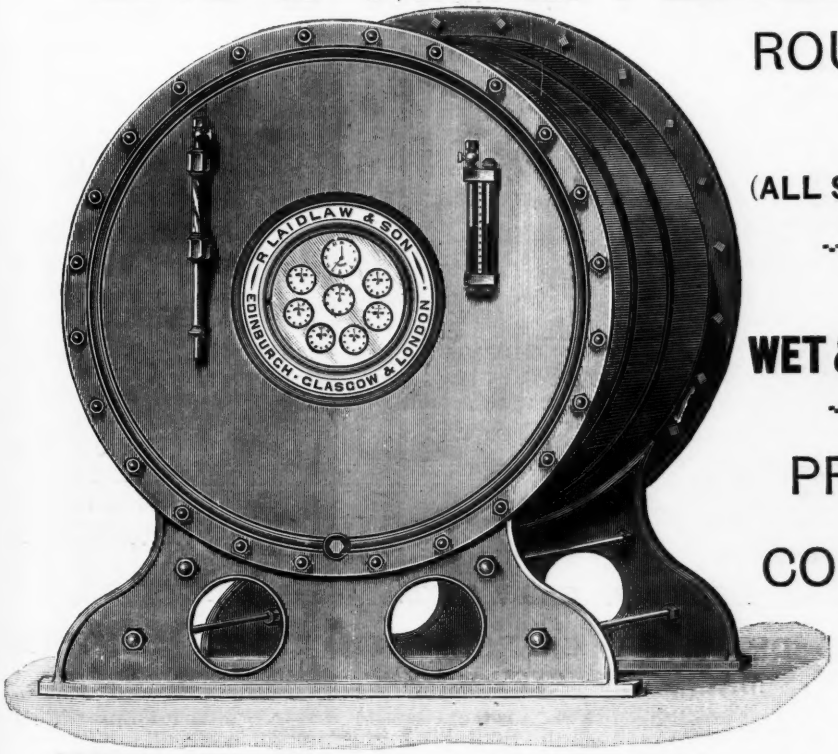

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PREPAYMENT AND COMPENSATING METERS.

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Poplar.

BROMLEY GAS-WORKS (KENT).

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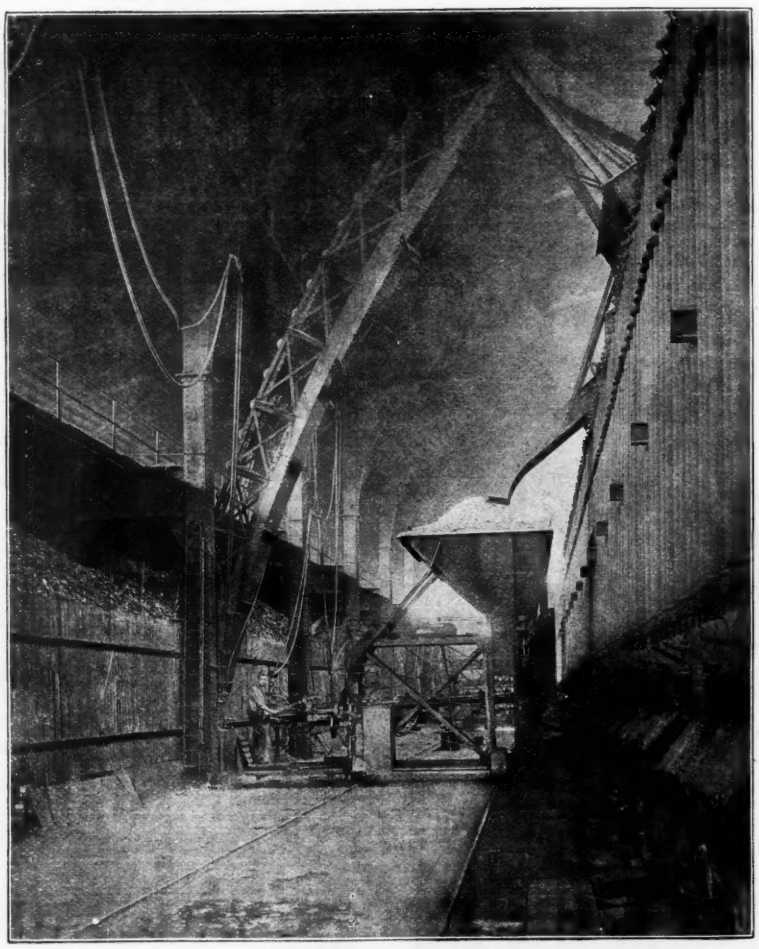

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Are Employed at the following Works—

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BRITISH GAS CO.—
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Vienna.

HAGUE CORPORATION GAS-WORKS—
Hague.

METROPOLITAN GAS-WORKS—
Melbourne.

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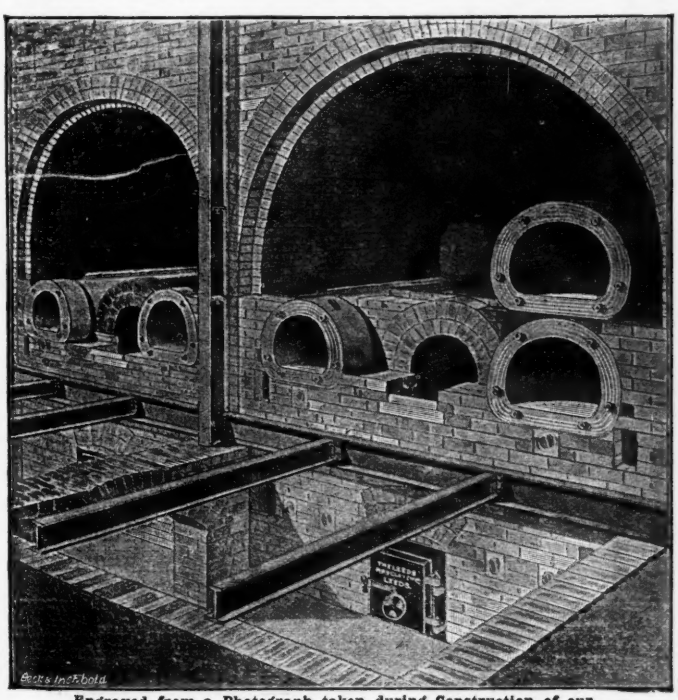

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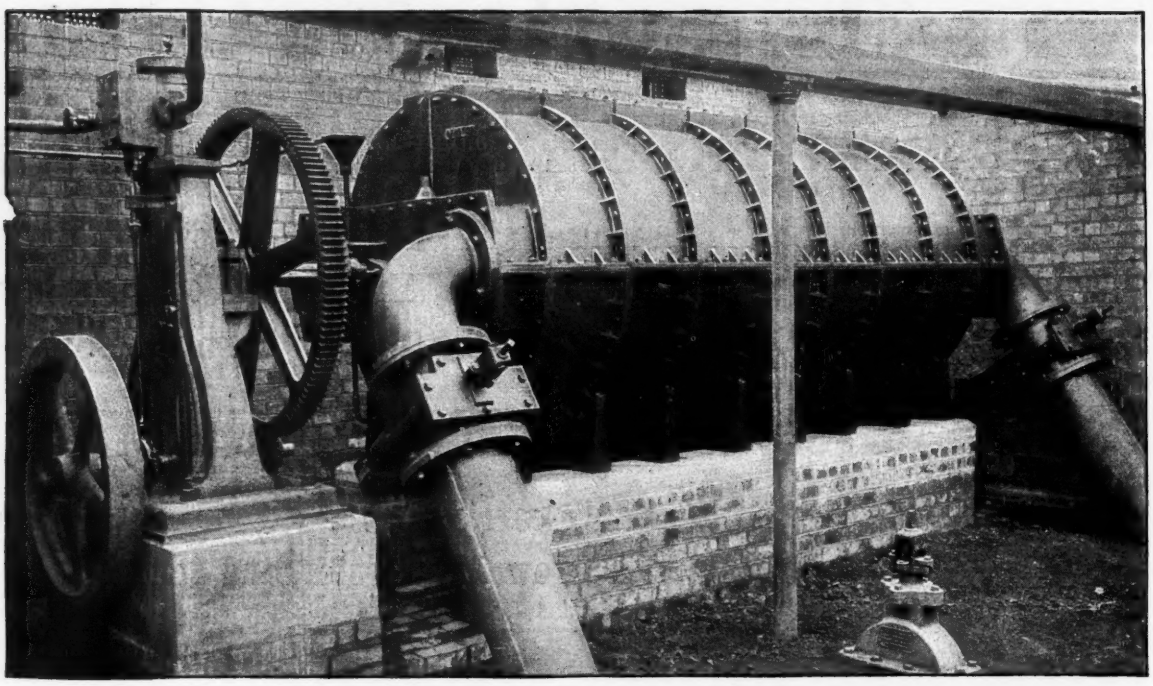

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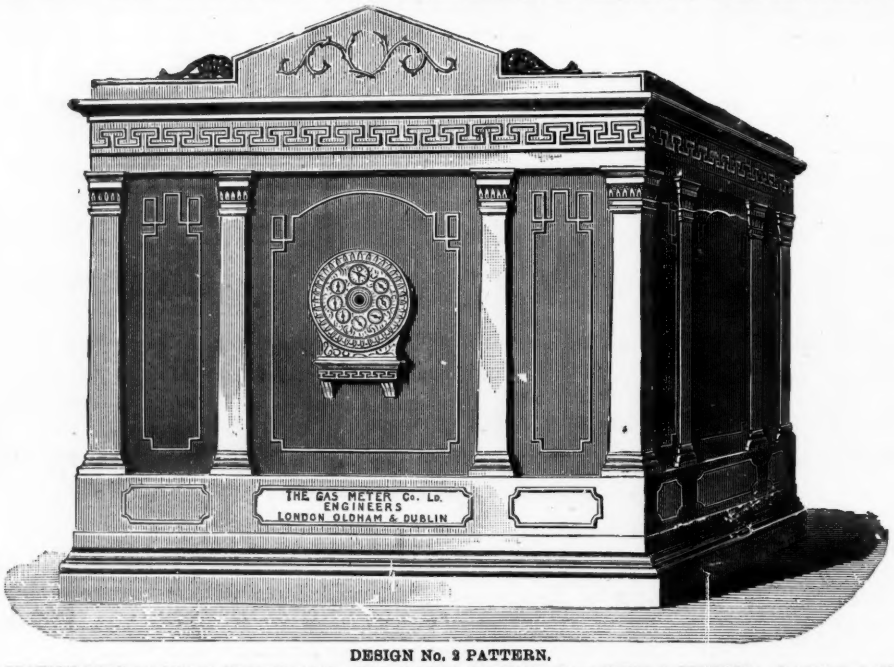

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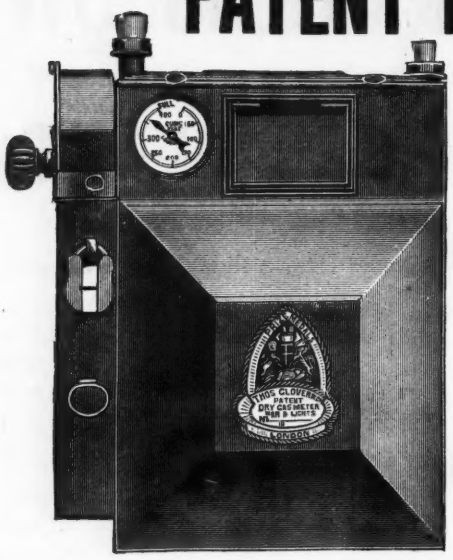

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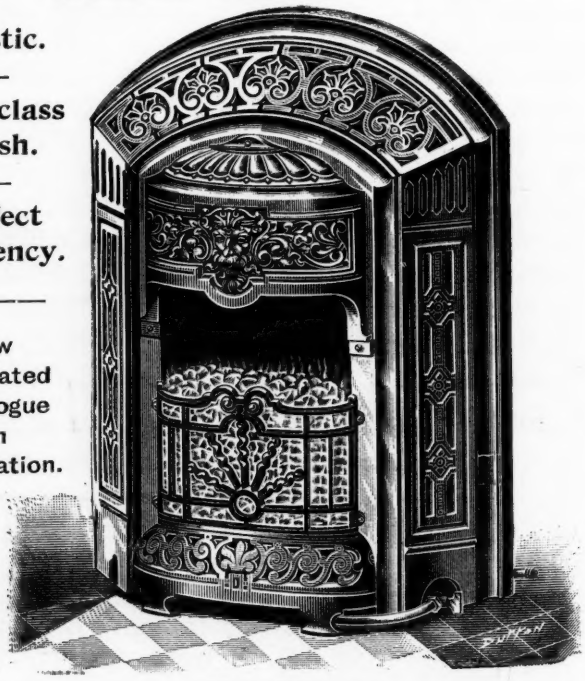

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EDITORIAL NOTES.

"'Tis Fifty Years Ago!"

READERS of the "JOURNAL" will perhaps pardon our proudly calling their attention for a moment to the fact that this is entitled to be distinguished as our "Jubilee" number; the first issue of "THE JOURNAL OF GAS LIGHTING" bearing the date of Feb. 10, 1849. It was originally a quarterly publication, with an intermediate supplement on the 10th of each intervening month. In many gas offices complete files of the "JOURNAL" from the first are kept; and there is no better reading for the student of the gas industry of to-day than this long continuous record of the technical knowledge and business vicissitudes of his fathers in gas. The "JOURNAL" appeared two years after the passing of the Gas-Works Clauses Act, 1847, had laid the foundations of the economics of gas supply deep and broad, as shown in an essay published in the first number of the current volume. It was the age of competition in gas supply, when the Metropolitan Authorities still believed that the way to obtain cheap gas was to launch another company warranted never to unite or agree with the old undertakings. And there was an electric lighting "boom" in progress, with injurious effects on gas shares! The question of cheapening the gas supply of London was discussed editorially in the very first number of the new "JOURNAL;" and the statesmanlike tone of the observations explains the success of the periodical from the start. The prospects of more competition are judicially examined; and the conclusion is formulated that "the whole system "upon which the lighting of the Metropolis is organized "is vicious, and that, if not modified, the evils will go "on increasing." The writer did not rest upon merely destructive criticism, however. He went on to propose a remedy for the mischief, as to which it is only just to remark that if it, or any considerable portion of it, had been accepted, the gas supply of the whole Metropolitan area would never have presented any more administrative problems, while the saving to the public is not to be easily calculated. The suggestion was for a complete, general amalgamation of all the then existing London gas undertakings in a "United Metropolitan Gas Company," on the basis of each concern taking amalgamated stock in the proportion of five years' purchase of the gross rental for the previous year. The maximum dividend on the united stock was to be limited to 6 per cent. The affairs of the Company were to be administered by a Board composed of 37 members, 24 of them being named by the shareholders, from whom six "paid" or, as we should now say, Managing Directors were to be selected. To these were to be added six Official Directors, to be nominated by the Court of Common Council and the Commissioners of Woods and Forests. The 36 Directors were to choose a Chairman. Unhappily the idea did not take with the public or the parties concerned; and the evils it would have remedied and prevented were aggravated and courted by the promotion of the Great Central Gas Consumers' Company.

How little the fundamentals of gas manufacture have altered for the last half century, appears from the fact that Mr. A. A. Croll, the Engineer for the Great Central Gas Company, stated the net cost of gas in London in 1849 at 1s. 4·67d. per 1000 cubic feet. Those who imagined that the selling price of gas must be modified, if at all, by scientific or technical improvements in manufacture, were sadly mistaken. Only the "JOURNAL" seemed to perceive the gain that might be realized by consolidating administrations and developing the business. Fifty years ago gas undertakings were worried over the rating question; and the first number of the "JOURNAL" contains the wording of a petition setting forth that "the present system of rating "gas-works . . . . is unequal, unjust, and oppressive!" Governors for gas-burners; an economic gas cooking-stove; the purchase of gas-distributing plant by Local Authorities—these and other "questions of the day" were dealt with in this remarkable first number of a technical periodical which has lived a useful life of fifty years, and deals with much the same subjects still. Perhaps the greatest difference of the fifty years is to be found in the Gas Companies' Share Lists. At that period very few of the London Companies' shares were quoted at par or over. The original South Metropolitan £25 shares were priced at only 21-23. Provincial gas property was, as a rule, worth more money.

After all these years, and with all the advantages referable to the better circulation of intelligence, and improved facilities for publication, the present enlarged and cheapened "JOURNAL" could not receive a higher commendation than would be conveyed in describing it as a worthy successor of the admirable original.

The Meeting of The Gaslight and Coke Company.

THE meeting of The Gaslight and Coke Company this day week was decorous, not to say dull. Before dealing with the transactions of the meeting itself, there are two incidental features of the proceedings which call for notice. These gatherings of shareholders are now held in the new staff refectory at the Horseferry Road, which is an apartment of the true retort-house style of architecture. It may be excellent for its ordinary use; but it is a vile place for speaking in. The Governor was heard with the greatest difficulty; and the speakers on the other side of the table were not heard by their fellow-shareholders at all. And whoever was responsible for the display of naked high-power incandescent light in the room ought to be ashamed of himself. Wherever the wearied eye turned, glaring white-hot pokers burnt their image into the brain, and convinced the observer that there is a great difference between strong lights and good lighting. It was a painful exhibition. Nobody in the room could avoid staring at the obtrusive lights, which were not wanted; and thereafter one could distinguish nothing else.

The address of the Governor (Colonel Makins) was as apologetic as the Directors' report. The Company had not done particularly well; but it was all the fault of the unseasonable weather. A reference to the personal reconciliation of the Governor with the erstwhile critic of the administration, Mr. G. Livesey, was early interposed in the address, without obvious connection with the context. It was not very happily done, inasmuch as it conveyed the impression that all Mr. Livesey's criticism had been nothing but rancour, and that now the two Chairmen have shaken hands nothing further of the same kind will be heard from the old quarter. It is difficult to reconcile this way of putting the matter with the nature of Mr. Livesey's strictures upon the Horseferry Road in the past. However, Mr. Livesey made no sign at the meeting; and it is not for us to say what he thought of the Governor's remarks on himself. Everyone who has the welfare of the Company and the gas industry at heart would be only too glad to get rid of every trace of personalities from the great problem of the Chartered position, if by so doing it were made easier to get at the root of the trouble. For it is idle to profess to regard the existing situation as safe or satisfactory, with gas on the north of the Thames at 10d. per 1000 cubic feet dearer than it is on the south side of the river. Even Colonel Makins had not the hardihood to claim that there is nothing wrong here; but he blamed the "system"—meaning the statutory system under which the London Gas Companies subsist. But the awkwardness of this admission is that the system is a general one, applying to all parts of the Metropolis alike. Observers are in the habit of saying there is another system which really accounts for the mischief—the system which can be conveniently designated the "Horseferry Road." Never mind who or what it is, whether it is the governorship or the office messengership. Here is the net result—3s. and 2s. 2d. charged for the same gas by the same undertakers. It is the anomaly that strikes the observer, and will be heard of more and more so long as it persists.

The Property in the Subsoil of Streets.

IT is not often that one meets with such a luminous judgment as that of the Court of Appeal in the case of *The Vestry of St. Mary, Battersea, v. The County of London and Brush Provincial Electric Lighting Company, Limited*. The litigation originated over a question of wayleave for laying a piece of main not much longer than the name of the defendant Company. The facts of the case recall the good old days of competitive gas supply, when acts of piracy and attempts to overreach rivals in the use of the streets for main laying were all in the day's work. The Company have a Provisional Order for Wandsworth; while the Vestry are the proud possessors of similar electric lighting powers over their own parish. There is a thoroughfare on the border between the districts, across which the Battersea parish boundary zigzags in the eccentric manner not uncommon. The Company were laying a main in this road; and they wanted to cross a part of the interfering parish, for which purpose they opened up negotiations with the Vestry. The latter body, however, proved to be recalcitrant. They would not accept an offer of a lump sum for the wayleave, but asked the ridiculous rent of £50 a year for their gracious permission to cross less than 100 feet of road. This fine the Company declined to pay; and matters were at a deadlock. But not for long. The Company wanted to push on with their work; and one Sunday night they clapped on their men and got the main through without troubling the Vestry further about it. So high-handed a proceeding naturally could not be passed over; and the Vestry duly went for a mandatory injunction to make the Company take up their main and restore the surface of the road. Sir Francis Jeune held that the Vestry had rights over the area in question, and that the Company had acted wrongly; and he issued the injunction as prayed—suspending its operation for the result of the appeal, which has just been decided. The decision of Sir Francis Jeune has now been reversed, and the injunction discharged. It is the reasons for this somewhat surprising, but wholly satisfactory, judgment that strike one as being so instructive and far-reaching.

In the first place, the Vestry failed because they proceeded on the wrong ground. They might have taken action under section 109 of the Metropolis Local Management Act, 1855, as a highway authority. Had they so elected, the Master of the Rolls "would not say what the "result might have been." They chose to plead that their rights were interfered with by the presence of the main in the subsoil of the street. This was fatal, inasmuch as it is completely answered by the judgment in *Baird v. The Mayor, &c., of Tunbridge Wells*. We cannot find this case in "Michael and Will." It was a fight between the Local Authority and the owner of the soil underneath the street. This case decided that the Urban Authority are vested with only such property in a street as is necessary for its control, protection, and maintenance as a highway for public use. This being the law, the Vestry in the present action could not maintain it as owners of the soil under the pavement. The Master of the Rolls concluded that "the plaintiffs had not made out that any rights of theirs "had been interfered with by the continuance of the pipes "in the position in which they were." At the same time, his Lordship was of opinion that the action of the Company in getting the main down on a Sunday night was "utterly and entirely illegal."

Lord Justice Vaughan Williams, in concurring, carried the point a good deal farther. He fully agreed that the admitted facts showed the Company to have taken a very lawless and high-handed course, for which he would have liked to punish them. But in saying so much as this, his Lordship called in question the conduct of the Local Authority. He evidently thought the Company had done wrong under strong provocation. Why had the Vestry refused to agree with the Company? "If the plaintiffs had acted "for the public good, he should have nothing to say further "than what had already been said with regard to the con-"duct of the Company; but if they had forgotten that they "existed for the public good, and had allowed themselves "to refuse the Company their permission to do that which "could in fact have been given without any harm to the "constituency—if that was the proper word—which they "represented in Battersea, and with great advantage to "the inhabitants of the adjoining parish, it would then take "away any feeling of regret that he might otherwise have "felt of having to leave the Company in a position of any "advantage which they gained by their lawless action." That is to say, where a Local Authority play "the dog in "the manger," they must not expect sympathy from the Court of Appeal. This is the most valuable point of the judgment.

Wrongful Distraint upon Hired Gas-Stoves.

IT will be seen by a report in our "Legal Intelligence" to-day, that the hoary question of the non-liability of hired-out gas-fittings to seizure for debt has been once more ventilated in the Higher Courts. Curiously enough, in turning over the pages of the first bound volume of the "JOURNAL" for the purposes of another paragraph in this column, we noticed that fifty years ago the Nottingham Gas Company obtained an Act authorizing them to let out gas-fittings on hire, and exempting such fittings from distress. The point in the latest case turned upon the action of a bailiff of the County Court, who seized a couple of

stoves belonging to The Gaslight and Coke Company, in the course of levying an execution, and sold them. The stoves bore the Company's label; and the hirer warned the bailiff that they were not his, but belonged to the Company. Notwithstanding this, they were sold. The action was against the bailiff; and it was pleaded in response that his proceedings had been *bonâ fide*. He did not notice the label; and it was not his business to attend to anything a debtor might say as to who might or might not be the rightful owner of property seized in his house. The County Court Judge upheld this view, and refused to give the Company damages against the officer. The High Court has brushed all this aside, and declared that the bailiff had no power to take the wrong person's goods, and then say he was not liable because he did not know to whom the goods belonged. He ought to have known; and he had every means of knowing. Consequently, he has to pay for his blunder. The stoves were sold for a fraction only of their value; but the Company get the proceeds and reasonable damages, besides their costs in the two Courts. It is a highly satisfactory judgment, and will materially enhance the protection already enjoyed by the statutory lenders of gas-fittings. As we have already remarked, the practice is of at least fifty years' standing; and it would have been a public calamity if it had been hampered by such risks as it was sought to excuse in the present case.

The Vauxhall Bridge Design.

The attack of the architectural critics upon Sir A. Binnie's Vauxhall Bridge design continues. As we have already remarked, Mr. Heathcote Statham began it; and his protest has been influentially supported by other competent judges, including Sir Edward J. Poynter, the President of the Royal Academy of Arts. On the other hand, a newspaper "interviewer" has put Sir A. Binnie upon his defence; and very effective it is, so far as it goes. Sir A. Binnie narrates how he travelled the Continent in search of good modern examples of stone bridge building, and finally fixed his admiration upon a bridge at Geneva. Then, when the sketch design was completed, a year ago, he showed it to the President of the Royal Institution of British Architects and the Professor of Architecture to the Royal Academy, by whom it was generally approved. Sir A. Binnie, fortified by the satisfaction thus shown with the Geneva model and this authoritative sanction, sets his critics at defiance, and declares that the new Vauxhall Bridge will be a credit to London, "rostral" lamp-columns and all. It is to be hoped that those who have approved of the design will come forward and say so. They certainly owe this measure of support to Sir A. Binnie. Plain men who have the world's work to do—to bridge the rivers, connect the cities, and light the world's highways—are no "artists." They do not profess to be; and be it whispered, they know enough about the "artistic temperament" to resign themselves to the lack of it. At the same time, these men and their employers are not always wholly without taste, as is freely admitted by those painters and sculptors whose immortal masterpieces they purchase for their own delectation. Yet when the practical men are engaged upon public works, where are they to turn for artistic guidance, and be sure of escaping abuse? The trouble is, not that engineers and local authorities despise Art, but that they do not know where to get it. In the world of Art, as elsewhere, there is a Government of the day, an official Opposition, and a small band of daring would-be Innovators, who jeer at all established authority, and indulge in many extravagances which sometimes contain the germ of what the Future will reveal to be Truth. It is only too true that in this country we do not encourage Art nor recognize the artist as we should, or even as the French do. Our punishment fits the crime—we have very little Art in our midst, and hardly any Artists outside the class of painters and limners. When we want to "testimonialize" anybody, we purchase for him some useless article in silver or gold designed by "Messrs. So-and-So, Limited." Is there one reader of these lines who knows a man who can make a piece of jewellery, in the sense that Cellini would have understood the term? As regards the new Vauxhall Bridge, Sir A. Binnie doubtless proceeded upon respectable, commonplace lines. He went about until he came across what he regarded as a suitable model; he had this copied and adapted to the particular site and traffic requirements; and he asked some respectable architectural authorities to come and look at it. Now he tells his critics that they may gibe their fiercest—he does not care. The pity of it is that a sense of the unworthiness of this humdrum, mediocre way of dealing with the matter does not seem to have penetrated Sir A. Binnie's official complacency, much less pervaded the counsels of his employers. Of course, it is difficult for a public body to act in accordance with that essentially elusive thing called true artistic feeling. What is Art to-day is not so to-morrow. The admiration of one man is the abomination of another. Still, there is a worthier way of doing these things than that which has borne fruit in the Vauxhall Bridge "design."

WATER AND SANITARY AFFAIRS.

The evidence given by Sir A. Binnie before the London Water Commission last week differs in a marked degree from some of the conclusions expressed by the Royal Commissioners in their interim report. In that document an encouraging view is taken of the situation of the East London Company, although, in order to guard against any risk, the Commissioners are disposed to enlarge upon Mr. Bryan's estimate as to the provision that should be made, and accordingly advise that arrangements should be completed as soon as possible whereby an auxiliary supply of not less than 20 million gallons per day would be available, "if necessary," for distribution within the East London Company's district. Evidently considering—as we have before had occasion to remark—that such an arrangement is practicable, the Commissioners add: "With assistance "on this scale at hand, the continuity of the constant "supply in the East London district would be, in our "opinion, for some years to come, reasonably secured." At the same time the Company are expected to improve their own resources as rapidly as practicable, in order that they may be "independent of all extraneous aid." In opposition to this, Sir A. Binnie represents the water resources of the Lea Valley as for all practical purposes exhausted in respect to the future, and considers that the construction of further storage reservoirs would be a wasteful expenditure of money. Reckoning upon a present deficiency of storage to the extent of 5308 million gallons, Sir Alexander said if even this were made good it would be insufficient for an increased population in a dry period of seventeen months. Still it has to be remembered that in addition there is the intercommunication scheme. This, however, is looked upon by the County Council Engineer as simply useful in keeping up a supply for East London until Wales comes to the rescue, aided in the meantime by the Staines reservoirs, and fed by an increased draft from the Thames. Not only is it a bad case with "the poor Lea" (as Viscount Llandaff, with a sly touch of satire, expressed it), but the Thames, in the opinion of Sir A. Binnie, is liable to damage by a demand in excess of what it can properly meet; rendering it necessary to add 28,500 million gallons to the net storage capacity of the reservoirs. It takes a good deal to satisfy Sir Alexander in the matter of reservoirs; and perhaps he may find it necessary to enlarge the works he proposes to construct among the Welsh mountains.

Concerning the River Lea, it is to be observed that the Bill of the East London Company, as explained by Colonel Lockwood, M.P., the new Chairman, proposes the construction of additional storage reservoirs to the extent of 5000 million gallons, involving an expenditure of a million of money. This, with the auxiliary supply, would seem to meet every reasonable requirement. Mr. Bryan estimates that in 1937 his Company will have to deal with a population of practically 2,500,000; requiring a daily supply of nearly 87 million gallons of water. Including an additional supply of 25 million gallons from the Thames, for which parliamentary powers will have to be obtained, a precise statement is made as to the manner in which the water will be obtained; the cost of the whole being £3,470,000. Substantially this is looking forty years ahead; and it is important to notice that the supply so reckoned upon is independent of any assistance from other Companies. A sober investigation of the subject is the great *desideratum*. But the extraordinary drought of last year seems to have induced an excited view of the necessities of London in respect to its water supply; and the prevailing talk has much the semblance of panic. As for the want of water to fill the reservoirs in the Lea Valley, Mr. Bryan maintain

his original position that there is no want at all except for works. When more water is required, all he has to do is to get money to put up more engines. The wells exhibit no signs of exhaustion. They will soon be giving 13 million gallons per day; and he believes it would be quite easy to pump 20 million gallons daily in the future. Another question is that of cost. Speaking of the entire water supply of London, Mr. Bryan reckons that the Water Companies could, by an expenditure of £15,000,000, do all that the Welsh scheme would effect by an outlay of £57,000,000. The truth is that the probable cost of the Welsh scheme is not yet known, while the outlay to be incurred by the Water Companies can be closely estimated. But let the latter be what it may, the burden simply falls on the shareholders, whereas what the County Council may do is at the risk of the ratepayers. Looking at the vast expenditure requisite to carry out the Welsh scheme, the annual charge for the redemption fund is a matter for the most serious consideration of every ratepayer. Roseate prospects are held out by the Progressives as to benefits to accrue to the people of London when the water supply becomes the property of the County Council. But Colonel Lockwood has been bold enough to say that these parties have misled the ratepayers as to the expediency of purchase; and for this reason he speaks of the County Council as "the Jack Cades of the nineteenth century." The phrase may seem a little rough; but it is warranted.

An able letter from Mr. W. H. Dickinson appeared in "The Times" last week. It is a candid letter, and in some respects admirable. It does not blame the Companies for bringing up a number of witnesses from Wales to raise technical objections against the Reservoirs Bill of the County Council. "All is fair in love and war;" and there is "nothing wrong" in the Companies, as opponents to the Council, taking every step they can to defeat the proposals of that body. Then why does Mr. Dickinson write? It is to show that the public must content themselves with watching year after year a series of "expensive and un-"edifying contests," so long as the water supply of London remains in the hands of private undertakers. This, after all, is a declaration of war. So long as the Companies exist, they are to be attacked, and there is to be no peace until they surrender on terms of purchase. But is it not equally plain that all these "expensive and unedifying "contests" would cease if the Council would leave the Companies alone? Why are the latter to be compelled to part with their property? Parliament has twice refused to sanction the buying up of the Water Companies; and Mr. Dickinson thinks it not unlikely that the Legislature may consider it the wiser course to let the present Purchase Bill stand over until the Royal Commissioners have reported. But Mr. Dickinson contends that there is no reason why the Welsh scheme should not be considered by a Select Committee. The Companies oppose it; for they have Bills of their own, providing a supply without going to Wales. "Hence this bitter conflict," says Mr. Dickinson. The Companies know full well that if the Welsh scheme is ever carried it will be used as a lever to bring down the value of the existing undertakings. The Companies very properly ask for parliamentary powers to enlarge their means of supply. The Council are under no necessity to devise a rival scheme. Mr. Dickinson says the auxiliary supply "will "not brook delay." Yet it will take fifteen years to carry out, during which period London will be dependent on the Water Companies. As a matter of policy, it is very clever to let the Purchase Bill slide, and to push the Welsh scheme to the front. We may thank the Chairman of the County Council Water Committee for putting the question on a plain issue.

Southern District Association of Gas Engineers and Managers.—The annual meeting of the Association will take place at the Holborn Restaurant next Thursday. As usual at the first gathering in the year, the principal business will be the delivery by the President (Mr. A. E. Broadberry, of Tottenham) of his Inaugural Address; and at the close of the proceedings the members will dine together.

Society of Engineers.—At the first meeting of the Society for the present year, held at the Royal United Service Institution, Whitehall, last night, the retiring President, Mr. W. Worby Beaumont, presented the premiums for papers read during the past session, and his successor (Mr. J. Corry Fell) delivered his Inaugural Address. Mr. Perry F. Nursey has succeeded Mr. G. A. Pryce Cuxson in the secretaryship, which he held some years ago.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 323.)

The Stock Exchange had another good time last week. Business almost every day was quite active, and as a general rule there was a free advance in prices. But this was not uniformly so; for fluctuations would now and then appear, and towards the close there were symptoms of the pace having been forced too much, and there was a general set-back. Still, on balance, the gains were fairly considerable. The upward movement was much aided by the Money Market, which was so easy that on Thursday the Bank of England could no longer postpone taking the other ½ per cent. off the rate, and reduce it to 3 per cent.—the 3½ per cent. rate having lasted a fortnight. The Gas Market had quite a noticeable week. Business was brisk and active, with a strong upward tendency. A large number of quotations have been advanced, embracing undertakings in all parts of the world, while only one has had a slight slip back. Gas-lights were firm, and steady throughout, possibly aided by the pacific and uncritical character of the proceedings at the general meeting on Tuesday. The ordinary and preference closed unchanged; but the maximum and the debenture advanced a point. South Metropolitan was strong, but not very active. The quotation gained a couple of points, with business marked as high as 148; and the debenture also rose. Commercials, after a bargain or two had been done "specially" at poor figures, had a long deferred rise. Some changes were made in the Suburban and Provincial list; but actual business done was very slight. Brentfords (which have had a good half year) rose; and they may well go higher. Crystal Palace also had a further advance. Business was fair in the Continental Companies. Imperial was a little easier, and receded a point; but the 4 per cent. debentures were higher. Union and European were steady. Among the rest, advances in value were scored by Bombay, Buenos Ayres, and Monte Video. The Water Companies started by being unusually brisk; but business soon settled down to its usual proportions. However, the tendency throughout the week was strong; and almost every issue, with the exception of the debentures, had a material advance.

The daily operations were: Business opened moderate in Gas on Monday—being mostly in Gaslight issues; and quotations did not move. In Water, East London, Lambeth, and Southwark ordinary rose 2, and Lambeth 7½ per cent. 5. Business roused to more activity on Tuesday; but prices were not at their best. Bombay and Buenos Ayres rose ¼, and Buenos Ayres debenture 1. The rate of increase in activity was maintained on Wednesday; but quotations did not move. In Water, East London and Southwark gained 1. Thursday's business was a little less active; but prices were strong. South Metropolitan rose 1, and Monte Video ½; but Imperial fell 1. Friday brought a large advance in values. Crystal Palace and Brentford old moved up 3, Brentford new and both Commercials 2, and Gas-light maximum and debenture and both South Metropolitans 1. In Water, Southwark "D" rose 5, Chelsea preference 4, Chelsea ordinary and West Middlesex 3, and Southwark ordinary 2. Saturday was fairly busy, but unchanged. New River rose 3.

ELECTRIC LIGHTING MEMORANDA.

Rivals in Business, Companions in Distress—Electricity Generation and the Smoke Nuisance—The Trouble of Intramural Factories—The Right of Property in the Subsoil of Streets.

An amusing little interlude—for the onlookers—in the comedy of "The Rivals," now in preparation for performance before the users of electricity in the City of London, was recorded in last week's newspapers. The leading parts in this piece are to be filled by the City of London Electric Lighting Company and the Charing Cross and Strand Electric Supply Company; and within a few days of one another these Companies were both haled before the Magistrates "for allowing black smoke to issue from their premises." In the case of the Charing Cross Company, who propose to largely extend their business by carrying a competitive supply into the City, the proceedings appear to indicate that they had better first set their works in order for doing inoffensively the business they already possess. The Company have been obliged to start another station across the water, in Lambeth; and the Lambeth Vestry have lately made up their minds that they will not allow their parish to become the smokiest in London—especially for the benefit of other places. There are plenty of smoky factories in Lambeth, as it is; but where these belong to a local industry—like the famous pottery—it is felt that some little inconvenience must be endured for the sake of the employment of so much labour. When it is a case of electricity supply for the Strand being provided at the cost of more smoky chimneys for Lambeth, the local Vestry do not see why they should be too complaisant; and accordingly the intruders were called to account, on nine summonses. The defence was a very poor one. The Company's Engineer had done his best, and could do no more until a new chimney, now being built "with more than usual rapidity,"

is available for service. The Magistrate did not set much store by this chimney story; and fined the Company £5 and 10s. costs on every summons—total, £49 10s. This was what is popularly styled "a warm up." That chimney will have to answer the purpose somehow.

The City of London Company got off better for the time being; but the proceedings are only adjourned. The St. Saviour's Board of Works were at them in respect of their Bankside station, which is an old offender. Ten summonses were taken out this time, for different dates of last month; and the Company had been already fined for an offence early in the month. In the circumstances, the Company had a fair right to complain that the prosecution was hasty in beginning again five days after the last conviction. On the other hand, the prosecuting Inspector alleged that the action was taken because the Company would persist in using a cheap, dirty coal costing 10s. per ton, instead of smokeless Welsh steam coal which would cost them 25s. per ton delivered. The difference of expense was stated to be about £1000 a week. This is a very serious matter—almost life and death to the Company, indeed—as their working expenses are already high. The defence, however, was a very weak one. The Company's Solicitor explained to the Court that the objection to Welsh coal was not the expense, but the ineffectual character of the fuel in question. "They tried it once, and were summoned for allowing black smoke to issue." Eventually the Magistrate consented to visit the premises, and see what the Company are doing. This was very kind of him; but it does not touch his duty to convict upon the evidence.

Lastly, to round off this tale of smoke prosecutions of electricity supply companies in London, the Electric Supply Corporation have been summoned at Greenwich for permitting a nuisance of the kind at the famous Deptford station. The defence was of the simplest and boldest. The Company declared that they use none but the very best quality of smokeless Welsh steam coal, and that their stoking appliances are of the most recent pattern. They brought their coal contractor to assure the Court that "no coal from the Rhondda Valley or Aberdare gives off black smoke;" but still they were fined £10 and £5 5s. costs. Another "warm up!" This sort of thing cannot go on indefinitely; but the end is not yet in sight. It is hardly necessary to say that we have small sympathy with the London Electricity Supply Companies in the general way; but it is impossible for any bystander of engineering or industrial proclivities to help feeling, if not for the Companies, at least for their devoted Engineers and working staffs in the circumstances. We have always entertained and expressed the highest admiration and esteem for these gentlemen; and upon their shoulders all the burden of this smoke nuisance worry rests. They have to do the best they can with the plant and fuel supplied to them; and they probably cannot help making smoke occasionally. At the same time, the Local Authorities dare not let the Smoke Prevention Act drop. The mistake has been that of the ancient gas engineers, in putting down intramural stations, and trying to work in too cramped a space. The partisans of gas, however, must really be pardoned for smiling over this agitation against the nuisance attending the production of the necessary current for the "cleanest, healthiest, &c.," means of lighting.

A striking story is that of the mainlaying difficulty between the County of London and Brush Provincial Electric Lighting Company and the Battersea Vestry, and how it was overcome. The Company have an Order for the district of Wandsworth; and there is a thoroughfare lying partly in Wandsworth and partly in Battersea, in which they desired to lay a main. They had no powers for Battersea; and consequently they negotiated with the Vestry for permission to traverse that part of the road which lay within the parish. They failed to come to terms with the Vestry, who would not take a reasonable lump sum for the wayleaves required by the Company, but demanded an annual rent of £50 for the subsoil occupied by 77 feet of main. This demand the Company rejected as extortionate; and, knowing that there was no prospect of the difficulty being overcome by ordinary means, they put a gang of men on one Sunday night, and did the job before the Vestry could prevent it. Thereupon, of course, the Vestry wrote requiring the main to be taken up and the roadway restored. The Company refused, and the Vestry applied for a mandatory injunction, which was granted. The operation of the injunction was suspended pending the result of an appeal, which has just been heard, and decided for the Company. Partly, the result was due to the line taken by the Vestry, who sued as owners of the subsoil in regard to which they asserted that the Company had committed a trespass. This was a mistake; the truth being that a Local Authority have no property in the subsoil of a street. Consequently, the Court unanimously discharged the injunction. It was recognized that the proceeding of the Company was high-handed and utterly illegal; so that they tempted even the Court to be high-handed with them. But law is law; and the Battersea Vestry failed because they did not prove that they had any rights in the subsoil which the Company had interfered with.

The Purification of Potable Waters.—M. Guichard points out in the "Journal de Pharmacie et de Chimie" that the water of the River Vanne contains 700 microbes per cubic centimetre when it arrives in Paris, and that this number has increased to 212,000 by the time it reaches the consumer.

PUBLIC LIGHTING IN EDINBURGH, LONDON, AND ELSEWHERE.

In dealing with Mr. W. R. Herring's Granton report last week, we specially reserved mention of that part of it which relates to public lighting. There is also another portion of the report which we passed over, wherein Mr. Herring offers to the Commissioners reassuring evidence as to the permanence of gas property. In many of the places visited by the Commissioners during their peregrinations, they saw entirely new gas-works being constructed, in others extensive reconstruction schemes were in process of execution. This did not look as if there was any fear of the future of the gas industry. Mr. Herring connects this confidence with the development of the incandescent system of gas lighting, which is greater on the Continent than at home; and also with the increased demand for gas for cooking and heating and other industrial uses, which we should say is greater at home than abroad. A progressive gas undertaking situated in the United Kingdom is in the happy position of having the two strings to its bow. Mr. Herring suggests, as a possible reason for the Continental popularity of incandescent gas lighting, the cheapness of the mantles abroad. While this observation is just, it must not be forgotten that the dearness of gas generally on the Continent imposes on the public economical ways of using it with a force which is not realized at home. Moreover, the fact that gas is supplied for public purposes under many concessions in terms of lighting effect, tends to favour the employment of the most efficient burner. Lastly, but not by any means least in the array of Continental influences that have favoured the spread of the incandescent gas light, must be reckoned the closer attention, and the more scientific spirit, with which the highly educated technicians of Continental civic administrations follow up all matters of this kind.

It is to be hoped that the travelled members of the Edinburgh and Leith Gas Commission returned home heartily ashamed of the way in which gas has hitherto been mishandled in regard to what has been humorously called the "public lighting" of the Scottish capital and its port. Mr. Herring states that the public lighting of the various towns and cities visited was an object to which very particular attention was paid by the deputations; and he makes bold to remark that "as regards gas lighting, no city or town was found to be so miserably lighted with gas as our own towns of Edinburgh, Leith, and the surrounding districts." On the other hand, Edinburgh was ahead of all in the lavish use of electric arc lamps *in the main streets*. The italics point the moral. There are two standards by which the public lighting of a town may be judged. The first refers wholly to the show made in the principal parts, which catches a stranger's eye. It is with this as with so many other human affairs—so long as the shop window is decked out with all the resources of the establishment, the condition of the back-door is thought to be immaterial. In the matter of her public lighting, Edinburgh is the slatternly beauty who bejewels herself for "company," while she is the veriest slut at home. The circumstance that she is not alone in this way of living is not to her credit. Doubtless, there are many towns where all the force of "improvement" is spent upon the show parts, and the back regions are abandoned to darkness and foulness unmentionable. According to the second standard of good public lighting, judgment goes upon the general performance, and that town is held to be discredited if any part of it is neglected.

Mr. Herring evidently feels strongly upon this matter. Like most gas engineers, he is probably disgusted at the unfair favour extended to electric lighting by the very same public lighting authorities whose only idea about gas-lamps is to stint their number and consumption to the last extremity. It is a really remarkable thing that in Edinburgh, as elsewhere, the misers of gas have gone to the other extreme and become the spendthrifts of electricity. The result, of course, is that the brilliant electric lighting gets an amount of credit that gas was never allowed the chance of earning. Every device is employed to conceal or excuse the high cost of this kind of display; but the worst of the situation thus created is, that where the total street lighting bill is swollen by the charge for the "shop window" effect, it is the other public lighting that has to suffer for it. The more beautiful the boulevard, the worse served the back street and the blind alley. Mr. Herring has discovered a report of a Commission of the Paris Municipality upon this matter, which bears out the principle of judging public lighting by the general, not the particular, performance. Indeed, this report classifies Edinburgh among those places whose example in street lighting should be shunned. Of course, London is "out of it" altogether, as we shall have to discuss presently. The palm for the best town's lighting is given to "Berlin, Hamburg, many of the towns of North Germany, and to a less degree Liverpool. These towns, limiting the use of electricity, and developing incandescent gas lighting, have found in the present condition of science the best solution of the problem how to do well and cheaply."

Mr. Herring "rubs in" to the Corporation the explanation of the miserable public gas lighting of Edinburgh, which follows in the first place from the fact that the gas is not used. It is unnecessary to repeat his indictment of the Edinburgh street lamps; and it must have been a pleasant reflection for him that the whole matter is actually in the hands of a Sub-Committee of

the Commissioners, who cannot longer neglect the public needs in this regard. It is worth noticing that Mr. Herring endorses the French certificate of Berlin as the best lighted city of Europe. This is plainly the result of an intelligent, united, and strong municipal administration, which stands no nonsense and cherishes no illusions. Truly, there are redeeming features about despotic government. The capable and well-informed gentlemen who manage Berlin are under no temptation to "rob Peter to pay Paul." They are not "Progressives" with inability to see more than one side of a question. When they "progress" it is by the way of actual town improvement, not by political agitation. The proof of this lies in the amazing fact that the Berlin city authorities actually treat electric lighting on its merits, just as they do gas lighting, and use whatever system they find most effective and cheapest! Why, with these dreadful iconoclasts, the electric light, instead of being the "light of the future," without which at whatever cost no town can regard itself as civilized, is already superseded and relegated to the position of being a light of the past!

This is simply because the Continental town administrations of the first rank know their business, and are able to do their duty without having to truckle to ignorant sentiment. We should say, also, that the autocratic city administrators of such communities as Berlin and Hamburg, are better educated in technical matters than the office holders under our own more democratic system of town government. The marvel is that English towns are so well governed as they are, seeing the haphazard way in which the administration is constituted. There is probably no country in the world where sheer intellect, trained and disciplined, is so largely employed in the conduct of public affairs as in Germany at the present day. Whatever may be the effect of this despotism of intelligence upon the political fibre of the people over whom it is exercised, the efficiency and economy that follow in practice from the system, as compared with the blunders and waste of the democratic system, are conspicuous. It is not here a question whether any other people than Germans would be content to live under this system of theirs. The fact remains that Berlin and Hamburg are the best lighted cities of the world; and it would be a confession of failure of their unique administrative system if it were otherwise.

Mr. Herring very rightly concludes his observations upon the defective public lighting of Edinburgh by expressing his confident belief that a better state of things can be brought about without much difficulty. What, however, is there to be said of London—for we are loath to confine all these lessons and suggestions to the case of the capital of North Britain? So long ago as last October, there appeared an article in the "St. James's Gazette" which characterized London as the darkest capital in Europe. The writer went straight to the root of the matter, pointing out that it is not as if we spent our money and energy upon the lighting of two or three great thoroughfares, and neglected the rest. That is what Edinburgh does, not to mention other places; but London exhibits a fine impartiality in this regard, and neglects the needs of the arterial thoroughfares quite as much as the others. There is the Strand, for instance, which the "St. James's" writer rightly describes as being, for its importance, "one of the meanest streets in Europe." So it is; and it is also one of the worst lit. The reason partly exists in the cutting up of London among petty local authorities, which have no united policy and no adequate sense of the importance of the street lighting service. And it so happens that the central local authorities of London are among the most backward of their order. We have repeatedly adverted in the "JOURNAL" to the sadly defective public lighting of the Strand district. The best public lighting in the Metropolitan area is in the outer belt. Central London is positively sombre, in comparison with a considerable number of the poorer suburban districts.

There is some excuse for the London Vestries in the disappointing character of electric arc lighting. Of course, in places like St. Pancras, where the Vestry have undertaken the supply of electric lighting on their own account, the fate of the streets is sealed. The public will have to put up with arc lamps, each of which costs about seven times as much as an ordinary gas lamp and replaces about five of them very inadequately. Where the Metropolitan local authorities retain their freedom of action, the process of the adoption of electric arc lamps for street lighting advances very slowly. Naturally—for arc lamps are very expensive; and they do not properly light the streets. In their wisdom, the electricians have pronounced in favour of fixing arc light columns centrally along the streets of the West End. The full beauty of this arrangement may be studied any night in Waterloo Place and Regent Street. There, the only people who benefit by the alteration from the old kerb gas lighting are those who love the darkness, for the classical reason. A peculiarly irritating effect of the mid-street lighting is that nobody standing on the pavement can read the labels, or even distinguish the colour of an omnibus. We have observed people at the foot of Waterloo Place, getting into the middle of the roadway, by the Guards Monument, for this purpose. If our Metropolitan local authorities had the courage of their opinions, like the Berlin magnates, they would clear every electric arc lamp out of the streets at the shortest notice.

The substitution of incandescent gas lamps for electric lights of either kind is the reform advocated by the "St. James's" writer. Doubtless, this should be the way of it; yet we trust it will be long before the genial high-power burners of the older type altogether disappear from the congested street crossings which they illuminate without glare. We agree most thoroughly with the critic of the St. James's, in regard to his denunciation of the usual poverty-stricken London street lamp-post and lantern. It is only too true also that "it is not at all unusual to see a column out of the vertical, and the lantern lop-sided and in such a condition as to make it quite useless." The excuse is that the narrowness of the streets, particularly of the footpaths, combine with the road traffic to make the position of a poor old lamp-post a precarious one at best. London street pavements are not half wide enough, as a rule, to give the lamps fair room. The size and importance of lamp-posts go with the space that can be afforded for them. Still, many of the London public lamp posts and lanterns are disgraceful.

It all comes back to this—for the adequate treatment of all these appurtenances and appliances of town life a better administrative system is wanted. English governing bodies as a rule fail to appreciate the part which science and art are able to take in dignifying our towns and saving the public purse. Anything is good enough, anybody can do what is wanted in such matters as public lighting. If London needs a new bridge across the Thames, the Engineer of the London County Council is called upon for the design; and some draughtsman supplies the architectural adornment, lamp columns and all. If new lamp columns are wanted for an old bridge, they send to Thames Street for the cheapest thing in stock. There is no sense in the average British "Corporator" of what is due to the scientific and artistic conscience. And yet the same Corporator will cheerfully vote money for the encouragement of Schools of Science and Art! These things are wearisome; but a better condition of the public mind can only be brought about, if at all, by dint of those who know better "pegging away" continually at their point.

ACETYLENE MOTORS.

ACETYLENE as a source of power is as yet practically untried. A few trials of the consumption of acetylene in small gas-engines built primarily for the consumption of coal gas, and a few researches with specially modified gas-engines, have been reported from time to time in the "JOURNAL." M. Ravel made comparative trials of acetylene and coal gas in a 2-horse power Clerk engine; and his results showed that, per indicated horse power per hour, the consumption of acetylene was about 13½ cubic feet, against 33½ cubic feet of coal gas. The ratio of the power of acetylene to that of coal gas, according to these figures, is about 2·5 to 1. Herr von Ihering made experiments on a 5-horse power "Otto" cycle engine, and found the consumption of acetylene was only 10·7 cubic feet per indicated horse power, and the ratio of the power of acetylene to that of the coal gas employed by him as 2·7 to 1.

We have received from Mr. C. Crastin, of Holloway, an account of some comparative trials of acetylene and coal gas in an "Otto" cycle engine, of which the chief dimensions were: Diameter of cylinder, 1·5 inches; area of cylinder, 1·767 inches; stroke, 2·5 inches; displacement by piston, 4·4175 cubic inches; and clearance space, 1·767 cubic inches. The number of revolutions per minute was 275; and every charge was fired, making 137·5 explosions per minute. The compression was 20 lbs. per square inch. Acetylene was delivered to the engine at 6-10ths pressure (Ravel, in his experiments, used a pressure of 63-10ths); and 15·916 cubic inches of acetylene and 591·49 cubic inches of air were supplied per minute. The proportion of acetylene in the mixture was therefore about 2·6 per cent., whereas Ravel used proportions ranging from 2·77 to 3·10 per cent. The consumption of acetylene works out at 0·552 cubic foot per hour. The run was of 24 minutes' duration. A similar run of 8 minutes' duration was made with London coal gas, which was delivered to the engine at 3-10ths pressure; 47·75 cubic inches of gas and 559·65 cubic inches of air being supplied per minute. The proportion of gas in the mixture was therefore about 7·8 per cent., and the rate of consumption 1·658 cubic feet per hour. The power developed in the two runs is stated to have been the same; but the report in our hands does not indicate how the power was measured. Assuming that it actually was the same, the ratio of the power of the acetylene to that of the coal gas was as 3 to 1; so that the relative efficiency of the acetylene was higher than in the trials made by Ravel and von Ihering. Mr. Crastin's results are therefore very interesting.

It is not easy to see what service can be performed by acetylene motors. For the propulsion of auto-cars, they do not appear very promising, because a generator would have to be carried on the car, since compressed acetylene is far too dangerous a commodity for practical use. Experienced automobilists find the work of controlling the driving and steering apparatus sufficiently onerous; and they would not care to be burdened with the manipulation of acetylene generating apparatus also. It is, however, possible that they might look with favour upon compressed coal gas or oil gas, fortified with (say) 30 per cent. of acetylene, as a fuel for employment in the motors of many types of self-propelled vehicles. The use of such a mixture is not attended with the danger which is inseparable from compressed undiluted acetylene.

WATER BILLS FOR THE SESSION 1899.

(*Continued from p. 240.*)

THE Crowborough District Water Bill is to extend the limits of supply by the Company to the parish of Mayfield, Sussex, "and so much of the parishes of Buxted, Rotherfield, Withyham, Wadhurst, and Frant in the county of Sussex and of Speldhurst in the county of Kent as are not comprised within the limits of supply defined by the Act of 1897 and are not within a radius of three miles drawn from the centre of the western door of the church of the Holy Trinity in Tunbridge Wells." The supply is to be made effective in seven years. Additional share capital to the amount of £20,000 is required, with the usual borrowing powers. New works are proposed, comprising a well and pumping station in the parish of Rotherfield, near Maynard's Gate, to be completed within seven years. Permission is sought for the gratuitous supply of drinking fountains.

The Herne Bay Water Bill is for conferring further powers upon the Herne Bay Water-Works Company. The capital is to be increased by £20,000, with the usual proportion of loan. An additional service reservoir is to be constructed at Mickleburgh Hill, in the parish of Herne Bay, to be completed in five years.

The Horsforth Water-Works Bill is to enable the Company to raise £30,000 of additional 6½ per cent. capital, with one-third loan. Lands for extensions of works are to be purchased compulsorily, within four years. The new works comprise a pipe line for conveying the water of a spring on Burley Moor into an existing reservoir, and another storage reservoir in the township of Burley-in-Wharfedale. The waters to be taken are those of Carr Beck and part of the flow of Coldstone Beck. Compensation water is to be provided at the rate of 74,000 gallons per day. The works are to be completed within ten years.

The Lowestoft Water and Gas Bill is to enable the Company to raise £80,000 of additional capital, with the usual borrowing powers. Extensions of the water-works are proposed, including new pipe lines and a service tank. Additional lands are to be acquired compulsorily; and certain public roads and footpaths are to be stopped up and another thoroughfare substituted. The new authorized footpath is to be completed and opened to the public before the old one is stopped up. Provision is made for bringing the whole transaction under the notice of Quarter Sessions. The new lands are to be acquired within five years; the works completed within fifteen years. The times appointed by the Company's Act of 1897 for the purchase of lands and the execution of works are to be increased by two years.

The St. Neot's Water Bill is to enable the Company to extend their supply to the towns of Sandy and Biggleswade, and to change the name of the Company to that of the St. Neot's and East Bedfordshire Water Company. New capital to the amount of £36,000 is to be raised, with the usual proportion of loan. The supply is to be made effective in seven years. Extension works are proposed, including three wells and pumping stations in Tempsford parish and a covered service reservoir at Sandy, to be completed within seven years.

The South Essex Water-Works Bill is to extend the district of the Company over numerous parishes and places named, the supply of which is to be made effective within five years. Additional capital to the amount of £300,000 is required, with the usual borrowing powers. The extension works comprise a well and pumping station at Mucking, and a service reservoir at Laindon Hills, to be completed within five years. Demands under £50 are to be recoverable through the County Court.

The South Hants Water Bill is to authorize the raising of new capital to the amount of £250,000, with the usual proportion of loan. The limits of supply are to be extended to include numerous parishes and places in Hampshire, including Brockenhurst in the event of the West Hampshire Company not exercising their statutory right of supplying this place within a year after the passing of the Act. Section 4 of the Act of 1894 is to be amended. The extension works include a pumping station with wells at Stockbridge, and a covered service reservoir on Lyndhurst Hill, to be completed within fifteen years. Lands are to be purchased within five years. Permission is sought for the discharge of water into streams. The Commissioners of Woods are to be empowered to grant leases to the Company. The rights of the New Forest Commoners are protected. Consumers are to be required to provide cisterns. The Company desire power to purchase the undertaking of the Bishop's Waltham Company at any time, upon giving six months' notice of their intention.

The Stockport District Water-Works Bill is to ratify and confirm certain agreements made by the Corporation of Manchester and the Stockport District Water-Works Company and their predecessors, the Stockport Water Company. The Manchester Corporation, by their Act of 1854, are empowered to enter into agreements with the several parties authorized to require the discharge of water down the River Etherow; and they accordingly made such an agreement with the old Stockport Company in 1859. This has been altered and extended by subsequent agreements with the present Company, which form the schedule of the Bill. The Company have paid the Corporation £1000 in consideration of a supply of water from the Corporation main between the Audenshaw and Godley reservoirs.

The West Gloucestershire Water Bill is to enable the Company to raise £60,000 additional capital, carrying the usual borrowing powers. The limits of supply are to be extended to a number of parishes and places in Gloucestershire and Somerset. The rates for domestic supplies in the extended area are not to exceed those in force in the older limits.

The Wetherby District Water Bill is to incorporate a Company with a capital of £45,000 and the usual borrowing powers, for the supply of a number of parishes in the neighbourhood named, in the West Riding, with the exception of the Tadcaster district. The supply is to be made effective within periods varying from two to five years. The source of supply is to be wells in the parishes of Wigton, Scarcroft, and Bardsey. The works are to be completed within five years. The Wetherby District Council are to have power to purchase their portion of the undertaking after 25 years, the arbitration to be under the Lands Clauses Acts as though in respect of a question of disputed compensation, and the arbitrator is to have regard to the probable increase of consumption and of revenue within the following ten years. Rates for domestic supplies are to range from 8 to 6 per cent. The price of water supplied by meter is not to exceed 1s. 6d. per 1000 gallons.

The Woking Water and Gas Bill is to enable the Company to increase their capital by £120,000, with the usual proportion of loan. It is desired to take water from the River Thames by means of a pumping station at Laleham. A well and pumping station are to be made in the parish of Shere, another at Albury, and two others in the parish of Stoke-next-Guildford. The quantity of water to be taken from the River Thames is limited to 3 million gallons per day. The additional lands are to be acquired within seven years; and the works completed within fifteen years. Water may be discharged temporarily into streams. The limits of supply are to be extended to Bisley, Wisley, Shere, and neighbouring places in Surrey.

The Yarmouth Water-Works Bill is to extend the limits of supply by the Company to Southtown and to other places, in which the domestic water rate may be 50 per cent. higher than that in the old district. The capital is to be increased by £160,000, with usual borrowing powers. The works to be authorized comprise a couple of pipe lines. The new lands are to be acquired within five years; and the works completed in fifteen years.

OBITUARY.

The death is announced of Mr. W. LITTLE, the Chairman of the Harrington Gas Company.

Mr. WILLIAM BOLGER, who was for many years Chairman of the Carlow Gas Company, died on the 30th ult. The funeral took place last Wednesday.

The death is announced of Mr. P. B. M'QUIE, a Liverpool accountant, whose name will be remembered by many of our readers from the fact that he was appointed by the late Recorder of Liverpool (Mr. J. B. Aspinall, Q.C.) to audit the accounts of the Liverpool Gas Company on behalf of the Corporation—an office which he held by annual renewal until his death.

Mr. J. G. HOLBURN, M.P. for North-West Lanarkshire, recently died at his residence in Leith. He was a tinsmith, owning a small business in Edinburgh, and, when Parliament rose, he was in the habit of going back to the bench. He was elected on the Leith Town Council, and was by that body appointed a member of the Edinburgh and Leith Gas Commission. Shortly afterwards he was returned to Parliament, and retired from the Council. He remained, however, in the Gas Commission until November, 1897, when his term of office expired. At a meeting of the Commissioners on Monday last week, it was unanimously agreed to minute their regret at learning of Mr. Holburn's death, and that the Clerk should convey to Mrs. Holburn their condolence and sympathy with her in her bereavement.

PERSONAL.

Mr. F. LECKIE, Secretary of the Motherwell Gas Company, has been promoted to the position of Manager; Mr. J. FULLARTON, who has hitherto held this position, undertaking the supervision of the outdoor operations.

Mr. ROBERT NELSON, assistant in the office at the Hamilton Corporation Gas-Works, has been appointed Clerk, in room of Mr. G. Keillor, who, as already announced, has become Manager of the Peterhead Corporation Gas-Works.

Mr. A. CADDICK, who is leaving Bath to take up his duties as Chief Assistant to Mr. J. W. Helps at Croydon, was last Friday the recipient of a handsome spirit-stand from the officials of the Bath Gas Company, as a token of the sincere esteem in which they had held him during his eight-and-a-half years' service with the Company. Mr. Caddick also received many beautiful gifts from the workmen; each department in the works making separate presents.

A pleasant gathering took place at the East Retford Corporation Gas-Works on the 27th ult., in connection with the Sick and Dividing Club connected with the gas and water undertaking, which was formed on March 1, 1898, by the workmen, with the view to helping each other in times of sickness. The Club has a membership of about thirty, and has had a record year of success; not having been called upon to pay out any sick money. Mr. W. SHADBOLT (the Assistant-Manager), having been one of

the prime movers in establishing the Club, was asked to take the position of Secretary; and the members, to show their appreciation of his services, and as a mark of the respect in which he is held, recently decided to make him a small presentation. The Engineer and Manager (Mr. J. B. Fenwick), who is Treasurer of the Club, offered the gift selected in a few well-chosen remarks; and Mr. Shadbolt suitably acknowledged it.

We learn with regret that Mr. ALFRED LASS has, in consequence of continued ill-health, retired from the office of Secretary and Accountant to the Barnet Gas and Water Company, and that the proprietors will be invited at the forthcoming meeting to consider a proposition respecting the grant of a retiring allowance to him. His official association with the Company dates from its inception in 1872; he having at the outset been appointed Auditor in conjunction with Mr. Beckworth. A year or so later, he was elected Accountant to the Company; and in that position he had, in those early days, some difficult work to deal with, as the affairs of the Company were not then in such a flourishing condition as they are now. In 1875, the Directors chose Mr. Lass to succeed Mr. W. C. Humphrys in the secretaryship; and he has continued to fill the office from that time until now to the full satisfaction of both the Board and the proprietors, among whom he numbers many friends.

NOTES.

The Cost of Running a Motor Van.

It is not often that the actual cost of running a mechanical road vehicle is given to the world; but this has recently been done by Mr. S. H. Sparkes for the behalf of the members of the Liverpool Self-Propelled Traffic Association. Mr. Sparkes's experience extended over a period of nine months, and his records afford valuable data for those who contemplate the substitution for horse haulage of mechanical power motor vehicles of any kind, not excluding gas power. The work to be done was the carrying of woollen goods and materials over the roads between several mills and the distributing centres. It kept two pair-horse teams going in addition to a considerable part of the time of a fifth horse; and the life of the horses was short, the work being heavy. The usual traction engine with waggons was unsuitable, and a Leyland oil motor van was procured for the purpose. Although a good deal of trouble of one kind and another was experienced with the van, Mr. Sparkes got 270 days' regular hauling done at a cost of £339 inclusive of the repairs, which were unavoidably heavy in the case of an experimental van. The kerosene, also, was dear—5·2d. per gallon locally. For horse haulage, the cost would have been at least £50 a year more. This result is regarded as highly encouraging, notwithstanding the fact that the dear oil and accidental damage to the machinery made the running expenses nearly 9d. per ton per mile. Even so little saving upon the cost of horse haulage in actual service, however, is the one all-important inducement for those interested in this branch of engineering to persevere in perfecting their measures.

The Luminosity of Sugar.

It is not often regarded by scientific persons that there is an unexplained kind of artificial light which seems to be of origin as mysterious as the luminosity of fire-flies. This is the light that can be struck out of crystallized sugar by friction, as mentioned in a communication of Mr. J. Burke to the British Association. Mr. Thos. Steel writes to "Nature" from Sydney describing an illustration on a large scale of this interesting phenomenon. He remarks that in the process of making what is known as granulated sugar, ordinary refined sugar is passed through a revolving sheet-iron cylinder, where it meets with a current of hot air, and is warmed and dried at the same time. On leaving the drying cylinder, the sugar is taken by a travelling band or other carrier, and dropped into a hopper, from whence it is drawn for packing. The sugar falling into this hopper forms a pyramidal heap, over which the stream descends; and if the operation is watched in the dark, the top of the pyramid of sugar is seen to be glowing with a steady pale blue light. Two pieces of ordinary lump or tablet sugar, rubbed together in the dark, will show the glow; and the breaking in two of a piece is attended by a bright flash at the moment of fracture. Stranger still, the light produced in this way is not affected by moistening the lumps with alcohol, and is intensified when water is used. When hard lumps of sugar are crushed by striking with any solid body, such as a shovel, the glow appears as a flash, and is easily seen even in the presence of a dull light. Masses of sugar that have become set in hard lumps exhibit the phenomenon brilliantly when two such lumps are rubbed together. Mr. Steel does not offer any suggestions as to the origin of the light, which seems to be different from any other luminosity.

What is Steel?

The terrible accident at the New York Gas-Works, the true character of which is beginning to be revealed by recent reports, lends added interest to the familiar question, What is steel? Dr. David Watson, Chairman of the Manchester Section of the Society of Chemical Industry, repeated this query in his address to the section. He observed that up to a certain period constructors of engineering works were content to take metals as they were produced naturally. Twenty-five years ago careful engineers specified for Low Moor or Farnley Iron cold-blast castings, and so forth, without further stipulation as to the character of the material. All this is changed nowadays, chiefly through the influence of steel. If the engineer could have his way, he would like a metal as strong as the strongest steel, as light as aluminium, as incorrodible as gold, and moderate in price. This is the constructor's North Pole, and although it may never be reached, in the endeavour he forces metallurgy to ever higher altitudes. Progress in this direction is, however, hindered by our ignorance of the conditions under which advance is possible. Nobody knows what steel really is. Analysis has long supplied the partial information that steel is iron containing carbon in certain quantities; and the steel maker by utilizing this knowledge can produce steel of various grades with more certainty than before. But the remainder of the answer to the question, involving the explanation of hardening and tempering, is still wanting. It has been established by microscopic investigation that compounds of iron and carbon are readily formed at high temperatures, and become dissociated or form other compounds as the metal cools. Time is an element in the operation. The whole subject forms an interesting study, the possible fruits of which are of the highest practical consequence; but the matter is still unsettled. The chief thing the modern constructor is certain of in respect to structural steel is that he knows very little about the true nature of any piece of it.

Cast-Iron Pipe Calculations.

An interesting discussion on the construction and laying of pipe-lines was held at a recent meeting of the New England Water-Works Association. The subject was opened up by a group of papers. The first of these was a communication by Mr. Dexter Brackett on the new cast-iron pipe used by the Metropolitan Water Board in Boston and the vicinity. Mr. Brackett stated that the Board carefully considered the growing practice of making large water-mains of sheet steel, and came to a conclusion adverse to the use of this material for the Boston mains. It was found that the thinness of the metal of such pipes rendered their life practically dependent on the protective coating; and where they had to be laid in streets with heavy traffic it would be difficult to keep the pipe from being injured. As the pipe job was a very heavy one, amounting to 75,000 tons, a careful determination of the necessary thickness was made for every size. In small mains, with a factor of safety of 5, the theoretical thickness of metal is very small, being only about 0·1 inch for a 6-inch pipe under a pressure of 100 lbs. Allowances for practical considerations have to be made, however, and the formula adopted to give the thickness in inches was:

$$t = \frac{(\text{Stat. press.} + \text{hammer}) \text{ rad.}}{3300} + \tfrac{1}{4}.$$

The radius is taken in inches. The value of the water hammer was assumed to vary between 70 lbs. in the case of a pipe from 42 to 48 inches diameter, 90 lbs. for a 20-inch pipe, and 120 lbs. for pipes under 12 inches diameter. The calculated thickness comes out rather under that usual for water-mains in the locality. The test bars (2 in. by 1 in. of the metal used) were required to bear a transverse load of 19,000 lbs. per square inch, and to deflect 0·3 inch before breaking. Many attempts were made to find a better "dip" than tar for these mains, but without any success. The mains were accordingly required to be uniformly heated and kept in the tar bath for 5 minutes. As an additional precaution, the interior of all pipes over 3·6 inches diameter was painted with paraffin varnish and vulcanite on their being taken into store.

Production of Sulphate of Ammonia, &c., by Blast-Furnaces.—At a recent meeting of the South Staffordshire Institute of Iron and Steel Works Managers, the President (Mr. H. Le Neve Foster), in the course of his Inaugural Address, stated that each ton of coal treated in a blast-furnace was now calculated to produce 20 lbs. of sulphate of ammonia; and this was being utilized at some of the Scotch furnaces. They had produced at one works from 30 to 40 tons of sulphate per week, besides 45,000 gallons of tar, 165 tons of pitch, and 25,000 gallons of oil.

Joint-Stock Enterprise in the Past Year.—From statistics just published by the "Investors' Guardian," it appears that joint-stock enterprise was fairly brisk during the past year. The number of companies registered—4653—has only once been beaten, and that was in 1897; while its aggregate capital, £240,853,504, is far in excess of the average of the past ten years. As a matter of fact, it stands the third highest of that decade. In the first six months of 1898 there were 2544 English companies registered; capital to the amount of £403,100 being subscribed for the supply of gas, £2000 for water, and £344,600 for electricity. In the second six months, there were 2109 companies registered; the capital subscribed being £704,000 for gas, £132,500 for water, and £3,107,764 for electricity. The totals for the year are: Gas, £1,107,100; water, £134,500; electricity, £3,452,364. The totals for 1897 were: Gas, £6,171,700; water, £260,200; electricity, £5,059,800—the total for the 4750 companies registered in that year being £269,391,715. Of the £20,525,758 of capital invested in the 392 Scottish companies formed in 1898, £133,158 was for gas, and £211,600 for electricity. There were 138 Irish companies registered; the capital being £3,885,900, of which £60,000 was for the supply of gas.

TECHNICAL RECORD.

INSTITUTION OF GAS ENGINEERS.

The Annual General Meeting of the Institution commenced last Saturday, at the Offices, No. 11, Victoria Street, S.W.—the PRESIDENT (Mr. G. E. Stevenson, of Manchester) in the chair. As usual, only formal business was transacted.

CONFIRMATION OF MINUTES.

The SECRETARY (Mr. Thomas Cole) read the notice convening the meeting, and also the minutes of the meetings held last year, which were confirmed.

ELECTION OF OFFICE-BEARERS AND MEMBERS.

The balloting-lists for the election of officers and members were examined by the SCRUTINEERS (Messrs. A. E. Broadberry and T. S. Lacey), who announced the result as follows:—

President—Mr. Frederick D. Marshall, of Copenhagen.

Vice-President—Mr. James W. Helps, of Croydon.

New Members of Council *—Mr. Thomas Holgate, of Halifax; Mr. T. S. Lacey, of London; and Mr. G. Winstanley, of Coventry.

Auditors—Mr. Magnus Ohren and Mr. Alfred Lass.

* The other Members of Council are: Mr. C. E. Botley, of Hastings; Mr. W. R. Herring, of Edinburgh; Mr. T. May, of Richmond; Mr. F. Livesey, of London; Mr. F. W. Stevenson, of Sheffield; and Mr. J. Tyson, of East Greenwich.

The following names were added to the roll of the Institution:—

Members—Mr. C. F. Botley, of Hastings; Mr. G. S. Frith, of Frodsham; Mr. J. O. V. Irminger, of Copenhagen; Mr. W. M'Crae, of Dundee; Mr. T. N. Ritson, of Kendal; Mr. J. M'K. Rowbotham, of Buenos Ayres.

Associate—Mr. T. R. Murray, of Halifax.

On the motion of the PRESIDENT, seconded by Mr. C. E. BOTLEY, the report of the Scrutineers was adopted.

The PRESIDENT then declared the meeting adjourned until Tuesday, the 2nd of May, at the Institution of Civil Engineers.

THE COST OF MUNICIPAL ENTERPRISE.

At the Meeting of the Society of Arts last Wednesday, an interesting paper on the above subject was read by Mr. DIXON H. DAVIES. The author discussed the general economical principles of the limitation of State functions applicable to Imperial and Municipal Government, and examined the four arguments usually brought forward in favour of Municipalism—viz. (1) Cheap money; (2) the right of the community to the profit of communal service; (3) the sordid motives of private enterprise; and (4) the objectionable nature of private monopolies.

In his introductory remarks, Mr. Davies observed that the laws defining the limits of State action, to the elucidation of which so much of the best thought, both public and private, of the present and the two previous generations has been devoted, have by this time received a fairly general acceptance by our Imperial authorities. It is now recognized that Parliament cannot itself initiate the energies of the nation, nor supply the spirit of adventure. These developments and qualities must be the product of the brains and the enterprise of the people themselves. All that the Imperial Government aims at in this regard is the preservation of the "open door"—the maintenance, that is, of a favourable medium of security and liberty within which the free activities of an industrious and adventurous people can (whether at home or abroad) operate without let or hindrance. There is a portion of the State, however, into which these important truths do not seem to have yet permeated. The local administrative authorities are as much a part of the State as the Imperial. They have similar rights to regulate the conduct and tax the pockets of the subjects as has Parliament itself. Indeed, it is probably not generally recognized how large a part of the State these authorities constitute, if measured by their relative fiscal importance. During the twenty years from 1878 to 1897, while the Imperial debt has fallen from £775,000,000 to £641,000,000 (a reduction of £134,000,000) the local debt has more than doubled itself by an increase of £138,000,000; and it now amounts to the enormous sum of £252,000,000, or, allowing for the accumulated sinking fund, £245,000,000 sterling. In the same period, while the local debt has increased 120 per cent., the annual amount of local taxation has increased 77 per cent., against an increase in the population (the paymaster who has to meet these increasing burdens) of only 23·6 per cent., and in the rateable value of his property of only 26·7 per cent. These figures relate to the whole of England and Wales; but taking the great towns by themselves, the local indebtedness appears to be more serious still. The debt to the nation of a citizen of Manchester is only £16 6s. 9d.; while his debt to the Municipality is £29 1s. 4d. The following are the figures of the local debts per head in other large towns: London and Sheffield, £10; Leeds, £11; Liverpool, £12; Nottingham, £15; and Birmingham, £17. The comparison of the local with the national debt is more startling when the relative ages of the two are recalled, for whereas the vital need of the nation's defence and other Imperial necessities throughout centuries are covered to-day by a debt of £641,000,000, these local burdens, the creation of the last thirty years, already amount to £252,000,000. Moreover, the national debt is not really a debt at all; whereas the reverse is the case with regard to local debts. The amount of local debt per £100 of rateable value for the large towns is shown by the following figures: London, £130; Liverpool, £210; Sheffield, £300; Leeds, £330; Birmingham and Nottingham, £385; Manchester, £525. For England and Wales it is £150. It is sometimes said that, as these liabilities are imposed by representative authorities, the matter is in the citizens' own hands—not a sufficient answer. To a large extent, the representative system, though existent in form is in practice inoperative in regard to these local bodies—they are so numerous. The consequence is that not one householder in a thousand understands the machinery by which he is governed, or can afford the time to find out how to exercise his franchise. All he knows for certain is that the rates grow heavier year by year, and that they must be paid; and he pays—and grumbles. He does not vote.

The author went on to show that corporations are surrounded by direct incentives to extravagance, without any adequate check on their power to expand their functions and increase their borrowing; and he contended that to leave them in this condition was unwise. He considered the United Kingdom in the light of a banking company, with the head office at Westminster and branches in every town; and he maintained that the policy which would be pursued by such a concern—to on no account embark the funds upon the chance of an adventure which might or might not succeed—would be equally sound policy for national finance. There were, he said, many reasons in favour of its adoption. The portion of the local debt at present invested in trade enterprises is, according to a recent writer, about one-half of the total. The rest of the expenditure has been upon matters of public health, improvement of streets, provision of parks, and the like, which are admittedly unsuited to private enterprise. The worst part of trading adventures for a municipal authority is that there is no closing their capital account. The author cited, in support of this statement, the case of electricity, the total indebtedness in respect of which is now only some £3,000,000; but he said that, "as it is fast advancing into almost universal use for trade as well as private purposes, if the authorities retain possession of this industry, and keep pace with the needs of the future, they will have to spend £100,000,000 where they have at present spent £1,000,000. Surely such a vista of capital commitment should," he remarked, "give pause to the counsels of those adventurous spirits who, with a vicarious enterprise, are so ready to land the ratepayers in further trading risks." It was not a good thing that capital should be had for the asking. "Borrowing dulls the edge of husbandry." When money in plenty is to be had at 3 per cent., a rigid economy seemed supererogatory.

Coming to the four arguments commonly advanced by the supporters of municipal trading, the author dealt with the first—cheap money. It is said that a public authority can raise money more easily and cheaply than a private company can, and that therefore to leave large undertakings in private hands is to sacrifice an economical advantage. But Mr. Davies asked if there was not a fallacy lurking there. "Nothing for nothing" was a sound rule. He thought the astute persons who finance public loans take care to exact the full market value of the risk they take. If a public authority pays less for money than a company would do, it is because the authority undertakes a higher obligation. However, the cost of borrowed money is a very small element in the success of a trading concern, as compared with personal talent; so that this advantage is not of the importance commonly attributed to it.

The second argument is that if a profit can be made out of the general supply of some commodity for the community, why should not the community realize the profit for itself? Mr. Davies pointed out that the great difficulty of a corporation engaging in a trade is to hold the balance evenly between the ratepayer as proprietor of the corporation works, and the ratepayer as consumer; for the two are not by any means identical. He said: "In Nottingham, the Corporation make a large profit out of their gas; and in one of the Committees of Parliament last year a prominent manufacturer spoke very bitterly of the feeling of the large gas consumers that they were charged unduly for their gas in order that the rates might be relieved. He stated that the profit on the gas was sufficient to defray the entire cost of the admirable Technical University of Nottingham; so that the large manufacturers were compelled to provide lavish educational facilities for the town out of their own pockets, for no reason except that they were, for the purposes of their business, the largest gas consumers. In fact, such a process is, they complain, stealing from the rich to give to the poor. Again, in Sheffield, the Corporation have just realized a handsome profit out of the working of the tramways; and they propose to appropriate £12,000 of this profit to reduce the amount which otherwise would have to be levied by increasing the general district rate by 2d. in the pound. But the working class who live along the tramway route are up in arms at this proposal. They say that

they are practically the sole users of the tramway; that a lowering of the district rate means hardly anything to them; and that the people who will benefit by that will be the rich property owners—in fact, that such an appropriation of the profits means a stealing from the poor to give to the rich. Suppose, in his bewilderment, the town councillor, thus attacked on both sides, says: 'We will not make any profits at all—we will reduce the price of the fares, so that the profit shall be extinguished altogether,' this would still be unjust to the ratepayer who does not burn gas or does not use the tramway, for he will have been burdened with an additional capital debt for the purpose of subsidizing his neighbour who has commercial needs that do not affect him. Such a ratepayer will say: 'Why should I be dragged willy-nilly into a huge trading venture with a huge capital in which I take no interest, and be called upon to elect directors for it, and otherwise spend my attention upon a thing which I do not understand?' The reasonableness of this will be understood from the case of the Liverpool electricity works, where (the figures are quoted from a recent speech of the Town Clerk) the customers of the works only number 3000, whereas the entire population of the city (some 700,000 people) is laid under contribution or liability to provide the capital and keep the works going—a disproportion which is surely a strong argument for the immediate disestablishment of electricity from municipal control."

Mr. Davies then passed on to deal with the third contention of the advocates of municipalism—viz., that the motives of private adventure are self-seeking and sordid, and contrast unfavourably with the disinterestedness of a town council. On this subject, he expressed the opinion that there is a great deal of cant—or at best ignorance—in this cry. "Where," he asked, "is the inherent beneficence or nobility in those who merely adventure other people's money?" On the other hand, no one who has seen the carrying out of a great public undertaking by private enterprise can have failed to be impressed by the high degree of courage, steadiness in adversity, tenacity of purpose, faith, and loyalty, which is required to steer it through the troubled waters of its early career. He thought it a mistake to attribute the motives of such individual adventure merely to pecuniary interest. The pleasure of accomplishing a great work of public utility and of deserving public fame, of vindicating the soundness of private opinion, and higher considerations, also enter largely into such motives. In a recent letter to "The Times," Sir Edward Fry said: "What is it that has made Englishmen what they are but their passion for individual freedom, their habit of acting on their own judgment and their own initiative, and their dislike—I may say their scorn—for the leading-strings of official authority? Without that freedom of individual action, England can never continue to be in the future what it has been in the past." Mr. Davies reminded his audience that bureaucracy cannot create advancement any more than grammar can create literature; and for our municipal governors to affect to sneer at the commercial motives of their citizens is, having regard to the mercantile authorship of our corporations, in as good taste as for a *nouveau riche* to turn up his nose at the commercial origin of his own father.

Coming to the fourth argument, Mr. Davies remarked that it is sometimes urged that certain fields of commerce are necessarily monopolies, and that it is better that the Government should be a monopolist than a private person. He thought there was some reason for this in such a case as the public supply of water, which, as a matter of common necessity, and one connected with vital questions of public health, may well be entrusted to the management of the civic officers, more especially as it does not involve any manufacturing risks, and cannot possibly be replaced by another article. But in other matters the cry of monopoly is, to his mind, only a pretence by which people are induced to concur in the municipalization of various trading undertakings. That such concerns are bound to become monopolies in the hands of a corporation may be admitted, for the whole power and authority of that body is used to defend them as such, and to prevent anyone else conducting a competing trade which, but for the corporation, they would be entitled to do. But to say that they are monopolies when they are in private hands is an abuse of the term. They are only monopolies so long as, by reason of their efficient service, or of the apathy of the community, the public do not choose to make the effort necessary to establish rival undertakings.

The author passed on to show that a grave deficiency in Government or municipal enterprise is that it is non-inventive—it never starts anything new, and is very slow to adopt inventions of other people. The bureaucratic system does not tend to progress, but to stagnation—to the fixing of ideas at their existing level of development. A municipal authority "may be able to carry on a simple trade such as the supply of water—a commodity of universal necessity, which, therefore, needs no pushing, cannot be replaced by the advancement of science, and can be managed on a system of strict routine; but in any branch of industry which is of a mobile character, and which depends on the education of the public and the tempting of customers, the private capitalist who understands his business and is free to conduct it in his own way without having to reckon with the opinion of a host of other people who know nothing about it, must have an incalculable advantage." Mr. Davies went on to ask: "How is it that this country, which taught the world the use of steam, should be so backward in electricity? How is it that while great systems of electrical power transmission are common in America, in Italy, in Germany, in Austria (constituting, as such systems do, an important new development in the division of labour, by enabling the small workman in a remote village to obtain his power 'on tap,' as it were, and so to produce almost as cheaply as can be done in the great steam workshops in the town), Englishmen are content with insignificant installations in monopolized areas? How is it that, while English machinery in the mechanical departments still holds its supremacy at home as well as abroad, in electrical matters we have to give place to other nations, and the whole of the plant for the electric traction of the underground railways of London is being ordered from America, and also that for the tramways of Leeds, Liverpool, Sheffield, Glasgow, and many more towns that can be named? Surely this state of things can only be accounted for by the unwise action of the Legislature in discouraging and restricting the enterprise of the capitalist, and in committing this promising industry to the sterile and monopolist hands of municipal enterprise."

The author proceeded to give, at some length, a history of the electric lighting industry, and of the power supply schemes of last session. He pointed out that the latter projects were supported by the Chambers of Commerce, and no one opposed them but the municipalities, who urged that powers should not be granted to companies to compete with them in the supply of electricity. "Surely," said Mr. Davies, "here we see the municipal trader in his true colours. He does not wish to trade in the same way that any commercial man trades—facing difficulties as they come, contending with his rivals whomsoever they may be, adapting himself to new conditions, scrapping his existing plant as soon as it is superseded, and substituting more efficient plant, often at great sacrifice. Your municipal trader will not hear of scrapping superseded plant. He wants protection for the ratepayers' trade. If science has shown that he is on the wrong lines, and has made an improvident investment, so much the worse for science, which must go to the wall before the necessities of municipal trading. Science must wait until his machinery wears out; that will be quite time to introduce anything new."

In conclusion, Mr. Davies remarked that it is a duty imposed upon all, by self-interest as well as by gratitude and patriotism, to fearlessly point out the insidious error which is creeping into the practice of municipal institutions, and to use every effort to arrest it before their decadence becomes irretrievable. This ambition to embark in trade will, in his opinion, be injurious to the corporations, for their efficiency must depend, not upon the profits which they may be able to make out of their various trading advantages, but upon the degree to which they can absorb into themselves the energies of the most capable citizens. He asked: "Is a course of action which puts them in competition with their own traders, which results in the imposition of something like an *octroi* duty upon a commodity that is fast becoming the necessity of every manufacturer, calculated to secure the respect of the trading community? Further, is it calculated in the long run to secure the respect of the working class?" His closing remarks were as follows: "The expenditure of public money in a district, the establishment of municipal works, the employment of large numbers of the ratepayers at municipal wages—these are very popular things while they last; but they are also very difficult things to stop, for they necessarily create in the minds of the more ignorant of the ratepayers false ideas of the function of the local government. How can you blame the wage-earner if he comes to think that it is the duty of the municipality to find employment for him; and how can you blame him if, when the inevitable disillusionment comes, he is disappointed and disgusted on finding that he is mistaken? Municipal trading is thus infected with the communistic poison. It begins by alienating the confidence of the manufacturers, and ends by alienating the confidence of the workmen from institutions which, so long as they confine themselves to their proper functions, are productive of such great good to the country.

Surely, therefore, says the author, corporations would be well advised to confine their functions to those important public matters in which all their constituents are equally interested, and which must of their nature be performed by the ratepayers in common, and which involve no taint of partiality or suspicion of class bribery, such as the administration of justice and police, the care of the public health, the provision of parks and open spaces, and so forth. Let them leave to private enterprise whatever private enterprise will undertake; keeping themselves in an impartial position, so that they may secure the unsuspicious loyalty and obedience of all the traders to the regulations which they impose upon them for the protection of the common interest. Let them adhere to the spirit of the constitution of Alabama, which declares, 'That the sole and only legitimate end of Government is to protect the citizen in the enjoyment of life, liberty, and property; and when the Government assumes other functions, it is usurpation and oppression.' A policy of antagonism to the trading companies on the part of our corporations would be an undoing of their own work. The immediate cause of the active commercial energies of which so much jealousy has been expressed is the liberty which has been secured to the individuals in the towns by municipal institutions—that 'liberty which is the nurse of all great wits;' and for

these institutions to interfere with and repress trading liberties, is both unnatural and self-destructive."

A discussion on the paper was opened by the Chairman (Sir R. E. Webster, Q.C., the Attorney-General), and adjourned till next Thursday, when the Earl of Wemyss will start the debate.

THE GAINSBOROUGH WATER-WORKS.

Reference has already been made in our columns to the extensions now in progress at these works; but the recovery, on the 28th ult., of a boring tool which was lost at a depth of 725 feet on April 1, 1897, may perhaps justify us in again briefly explaining the nature of the scheme now in hand, and the vicissitudes it has passed through since its inception.

Previously to 1885, the water supply of the town of Gainsborough was derived exclusively from the River Trent, which at this point is not quite as satisfactory from a sanitary point of view as the Rivers Pollution Commissioners might consider desirable. With a rapidly increasing population, it became at last a matter of considerable difficulty to efficiently filter the water from this source; and the Local Board of that period (1885) decided to sink a trial boring into the old red sandstone, and see if they could not procure from this source a supply pure enough to obviate the necessity of filtration, and sufficient in quantity to meet the growing needs of the town. In that year, therefore, a boring was sunk on the site of the old works, piercing the 725 feet of Keuper marls, and penetrating the sandstone for a depth of over 250 feet. From this, a very plentiful supply of excellent water was obtained; and the Local Board decided to retain the test-pump erected by the Contractors, in order to supply the town with water from the boreholes. So successful did this prove, that the test pump has been in use as the main source of supply until the present time.

In the year 1890, the Local Government Board, in sanctioning a further loan on account of the works, expressed some doubt as to the ultimate success of the borehole supply; and upon this the Local Board decided to consult the late Mr. Thomas Hawksley, as being the highest authority on matters of water supply. He reported upon two schemes—one for utilizing the Trent water, and the other for extending the boring—and although his estimate for the latter was much less than for the former, he strongly advocated the adoption of the river scheme. The Local Board, however, both because of the great cost of the river scheme, and on account of the success which had already been achieved in connection with the borehole decided to take further advice on the matter; and they consulted Mr. De Rance, the eminent Geologist, and the late Mr. Jabez Church. Both these authorities advised the extension of the borehole scheme; and ultimately in 1893 the Local Board adopted Mr. Church's plan for the construction of a deep well and an adit driven into the borehole to tap the supply therein. Tenders were obtained for the work; but before carrying it out, the Board were invited to inspect the water-works at Widnes, where two deep borings were relied upon for a supply without any well—that is, the pumps were fixed in the borings. This method offered so many advantages over the well scheme, that the Board asked Mr. Church to advise them upon the question; and after a lengthy and exhaustive discussion, it was admitted that a borehole scheme would (1) be less costly than a well scheme, and (2) would afford a duplicate source of supply, inasmuch as it involved a second boring, instead of a well which would depend upon the first boring for its supply.

The Local Government Board having sanctioned this alteration, the work was commenced in 1895; and by June of that year the boring had reached a depth of 110 feet, 30 feet of which was lined with 30-inch cast-iron tubes. In August, the depth reached was 215 feet, and in November 310 feet. This portion was bored first to a diameter of 18 inches, and was then enlarged to 36 inches diameter, when the 30-inch lining-tubes were lowered and bedded at a depth of 322 feet, in March, 1896. In this month occurred the sudden and unexpected death of the Local Board's Engineer (Mr. Jabez Church); and his place was taken by his partner, Mr. Percy Griffith, who is in charge of the work at the present time.

In continuing the boring below the level reached in 1896, great difficulties have been met with, the most serious of which was the dropping of a 21-inch boring tool and some hundreds of feet of rope to the bottom of the boring, when at a depth of 725 feet. This occurred, as stated above, on April 1, 1897; and the past 22 months have been occupied in recovering the tool, which, on falling, became at once embedded in the loose material at the bottom of the boring, and thus proved very difficult to get at. After a futile attempt to lift the tool—which, with the attached rods and jars, weighed about 30 cwt.—by means of the usual grappling tackle, the method adopted for its recovery, now happily successful, was the enlargement of the boring from the bottom of the 30-inch tubes (which extend to a depth of 300 feet) down to the tool itself, to a diameter of 29 inches. Owing to the uncertain and varying nature of the marls through which this part of the boring passed, the work has been of an extremely tedious nature; and it was at one time suggested that the Contractors (Messrs. E. Timmins and Sons, of Runcorn) should be directed to abandon the boring and sink another. But, on the advice of Mr. Percy Griffith, the Council decided to leave the matter in their hands, and to wait patiently for the result. There is no doubt that this was the most satisfactory course that could have been adopted—seeing that any other alternative would have involved far greater loss of time and much more expense. Now that the work of boring can be resumed, it is expected that this will be completed in about nine months' time, after which the new pumping machinery will be installed as quickly as possible. The boring, when completed, will be 1450 feet deep, and of a diameter of 18 inches at the bottom; so that this will be one of the largest of the kind in existence—at any rate in this country.

As regards the supply of water available, the No. 1 borehole, which is now 1200 feet deep and 10 inches in diameter at the bottom (having been deepened in the year 1893), has been tested up to 25,000 gallons per hour without any sign of failure; and it is expected that at least 137,000 gallons per hour will be available from this boring. The water-level, when at rest, stands less than 10 feet below the surface; and it may therefore be concluded that the new boring will yield a practically unlimited supply. At the present time, the Council are replacing the old test-pump in the original (No. 1) boring with a new one of larger capacity—viz., 37,000 gallons per hour—the contract being in the hands of Messrs. D. Stewart and Co., Limited, of Glasgow, and the work being executed under the supervision of the Council's Engineer. This work is now well advanced, and is expected to be completed in a few weeks' time.

The Gainsborough Council are to be congratulated upon the enterprise and perseverance which have characterized their efforts to render the water supply of the town as efficient and as abundant as it is possible to make it; and on the completion of the work now in hand, together with the large storage reservoir, tower, and new rising main recently completed under the supervision of their Surveyor (Mr. Henry Riley), they will undoubtedly have one of the finest water-works in the kingdom.

Free Meter Fixing at Bolton.—The Gas and Lighting Committee of the Bolton Corporation have adopted a recommendation of the Works Sub-Committee that all meters, of whatever size and for whatever purpose used, should in future be supplied and fixed free of cost to consumers within the borough.

The Birmingham Water Scheme.—The last of the three tunnels between Knighton and Dolau, on the Birmingham water-track, was pierced on Saturday, the 28th ult. The total length of this tunnel is 4¼ miles through hard rock; and it reflects very highly on the skill of the Chief Engineer, Mr. J. Mansergh, and Messrs. Brightmore and Fairbairn, the local Engineers, that the drills from either end actually met point to point.

New Pumping-Station for St. Helens.—The Finance Committee of the St. Helens Corporation have had a report from the Town Clerk to the effect that the sanction of the Local Government Board has been received for the raising of £26,000 in respect of the construction of the new pumping-station at Melling, near Ormskirk; and that the time for the repayment thereof is 38 years. It has been resolved to apply to the Board for a consent order for the creation of Corporation 3 per cent. redeemable stock to this extent.

Gas-Meter Rents and Electricity Consumers at Leeds.—The Leeds City Council, at their meeting last Wednesday, authorized the Gas Committee to charge a rental for gas-meters where the consumption is considerably smaller than the capacity of the meter. The resolution abolishing all gas-meter rents was varied accordingly. Alderman Lowden explained that the change was chiefly directed against those consumers who had adopted the electric light, and ceased to use more than a comparatively small quantity of gas.

Tamworth Water Supply.—The Manager of the Tamworth District Water-Works (Mr. H. J. Clarson) reports that, although 21,766,638 gallons of water were pumped less than in 1897, the revenue last year yielded an increase of £357. During the year 131,041,962 gallons of water were pumped, as compared with 152,808,564 gallons. The works are now supplying a population of 18,800. The average consumption per head per day is 15¾ gallons; and inclusive of trade supplies, 19 gallons. The surplus revenue on the past year's trading amounts to £1284.

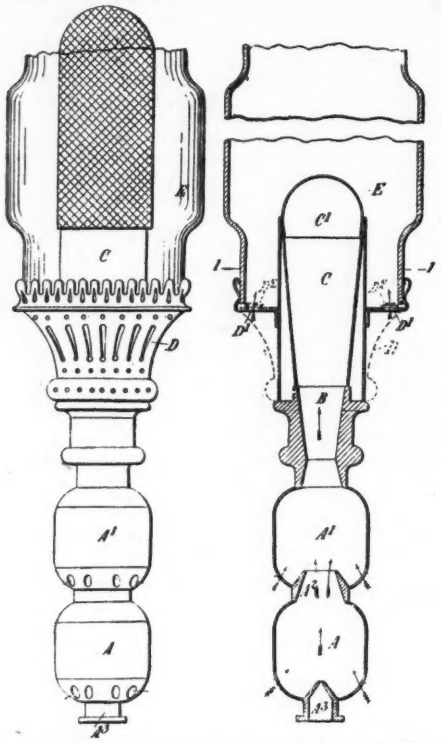
The Gift of a Village Water Supply by Lady Carlisle.—The Malton Rural District Council recently considered plans, estimate, and specifications of a new scheme of water supply and drainage for Welburn, Castle Howard, prepared by Mr. R. Richardson. The Clerk also produced a draft agreement, signed by the Countess of Carlisle on behalf of the Earl, leasing to the Council three springs of water to supply the district for 99 years, subject to renewal, at the nominal rent of 1s. per annum. The land for a reservoir, &c., was granted on similar terms, as also way-leaves for the laying of pipes; and land for a filter-bed was offered at the nominal rent of £1 a year. The Clerk said that, thanks to the liberality of the Countess, the cost of the whole scheme on borrowed money would only require a rate of 1s. in the pound in the first instance. The scheme was approved of.

Stonehouse Water Supply.—At the Stonehouse Town Hall last Tuesday, Mr. A. Ducat conducted a Local Government inquiry into an application by the Stonehouse District Council for sanction to borrow £2500 for work in connection with the new water supply of the township. Mr. R. R. Rodd supported the application on behalf of the Council, and explained that in June last the maximum supply of water under the new agreement was received from the Corporation of Plymouth, and simultaneously the pressure was considerably increased. This revealed certain defects in the mains, and necessitated a larger expenditure for repairs than was estimated for when the sanction for borrowing £2300 for water purposes was applied for. Hence the application for leave to borrow a further £2500. The Surveyor (Mr. A. W. Debnam) gave evidence, and there was no opposition.

REGISTER OF PATENTS.

Incandescent Gas Lighting Apparatus.—Greyson de Schodt, P., of Brussels. No. 2131; Jan. 26, 1898. Date claimed under International Convention, Sept. 17, 1897.

This is a modification of the arrangement described in patent No. 1252 of 1897, wherein the inventor's "improved system of incandescent lighting and heating" was described—comprising the employment of a mixing chamber wherein is produced an air current passing in the same direction as the gas current discharged from the injector. This arrangement, which is capable of producing its effects when the air current enters at or near the gas-injector, has also a useful effect if the air current is produced around the column of a mixture already formed—on condition, of course, that a fresh mixing process is to take place prior to the moment of combustion. This mixture, however, leaves the burner with a *vis viva* still, comparatively speaking, rather intense. Any diminution of the resistance at the point of leaving the burner would thus constitute an advantage—tending toward the solution of the problem of creating high temperatures—and these were the considerations which led the patentee to alter certain parts of the burner.



According to the present invention, the mixing chamber formerly described is surmounted by another similar chamber; and the column of the mixed products enters this second chamber through a widened injection-cone, and in leaving the same reaches a combined convergent and divergent cone, and thence enters the burner. The burner is surmounted by a wide-meshed wire gauze cap of hemispherical form, and carries a chimney gallery completely closed at the lower part, excepting for a few holes surmounted by wire gauze.

A A^1 are the two mixing chambers, arranged one above the other, and communicating by the injector-cone A^2. Each chamber has perforations near its base, for the entrance of air. Above the upper chamber is located the combined convergent and divergent cone B, which carries the burner C terminating in the hemispherically shaped head C^1. D is the chimney gallery, and E the chimney supported thereby. D^1 are the holes in the lower plate of the gallery; and D^2 is the wire gauze with which the holes are covered.

The gas issuing from the injector A^3, and passing into the lower mixing chamber, carries along with it a certain quantity of air. The mixed air and gas, owing to the parabolic surface of the upper part of the chamber A, passes through the upper injector A^2 into the upper mixing chamber, which is under the influence of the sucking action of the chimney E. In point of fact, as the gallery D only allows a very small quantity of air to pass into the chamber, and this with a resistance which is double that offered by the wire-gauze cap C^1 (owing to the two wire gauzes D^2 over the holes D^1 in the gallery), it results that the suction produced by the products of combustion escaping from the chimney is more easy and regular within the burner than below the gallery, and consequently in the upper mixing chamber. The mixture issuing from the latter is, therefore, sucked up; while at the same time a fresh quantity of air is drawn in—entering the upper chamber through the openings provided therein, and being forced into, or intermingled with, the mixture by the effect of the parabolic surface at the upper part of the chamber.

The mixture of gas and air thus thoroughly intermingled is then drawn through the combined convergent and divergent cone B, and enters the burner C, whence it is discharged through the wire-gauze cap C^1. The hemispherical shape of this cap (if the space occupied by the wires forming the gauze be deducted) gives an outlet surface equal to the cross section of the burner; "so that the counter-pressures so objectionable in burners employed at the present time are avoided."

The effect of the hemispherical cap combined with the double chamber A A^1 is, however, so considerable that, with a very slight pressure (such as is met with at many points of the gas conduits), the suction of the chimney may be dispensed with.

Gas-Igniting Devices.—Jürgens, J. F. C., of Altona, Germany, and the Automatic Universal Gas Lighter, Limited, of Copthall Avenue, E.C. No. 2312; Jan. 28, 1898.

This igniting body consists of a small pellet or pill of porous material charged with spongy platinum, and provided with platinum filaments. A block of refractory material—preferably in the form of a small centrally perforated cylinder of carbon or pipe clay—is secured to the igniting body by a layer of plastic material (kaolin or fire clay), and by filaments of platinum wire, which are passed through and around the block and body, and have their ends tied together and arranged to depend or project, when in use, into the path of the gas escaping from the igniting-tube. There are vertical spring-arms between which the cylinder is placed, so as to be supported vertically without subjecting the igniting body to pressure. The arms are formed in one with a slightly tapering vertical tube adapted to slip over and rest upon the upper end of the igniting-tube, and having a vertical gas-exit opening through which gas can flow from the igniting-tube and impinge upon the igniting body, so as thereby to heat it to a sufficiently high temperature to render the metal filaments hot enough to ignite the escaping gas.

Acetylene Burner.—Worsnop, C. H., of Halifax, and Barraclough, J. H., of Thornton. No. 2366; Jan. 29, 1898.

The burners that are in general use at present are said to "choke up with a glue-like substance, which is formed in the burning of acetylene gas;" and so the patentees have arranged a burner containing inside the body a spring and a pin, intended for cleaning the aperture out of which the gas passes.

Indicating and Recording from a Distance Changes of Level in Reservoirs, Gasholders, &c.—Barr, J., of Kilmarnock, and M'Whirter, W., of Glasgow. No. 4759; Feb. 26, 1898.

This is an improvement in apparatus of the kind described in patent No. 5575 of 1893, and more particularly in the receiving and indicating part of such apparatus.

Right and left electro-magnets are arranged for acting oppositely on the indicating mechanism, accordingly as a positive or negative current is transmitted by the line wire (from a reservoir, for example). The electro-magnets are placed horizontally opposite to each other, and act on separate armatures. Each armature is fixed to the lower arm of a curved two-armed lever, centred on the framing at a short distance above the electro-magnet; its upper arm extending upwards and over towards the middle, and having at its end a pawl for acting on a comparatively large wheel formed with specially shaped teeth. Each curved lever is provided with an adjustable counterbalancing weight, just sufficient to move its armature away from the electro-magnet when unattracted; and adjustable stops provided with rubber buffers are arranged to limit the movement. The curved levers act on separate wheels fixed on one spindle, and having on it a pinion gearing with a spur wheel on the spindle carrying the indicating pointer arranged to move over a dial. The teeth to be acted on by the pawls of the curved levers are pointed, and made each with one side radial and with the other side inclined; the radial and inclined sides of the teeth of one wheel being reversed relatively to those of the other wheel. When not acting on the wheels, the pawls of the curved levers are clear of the teeth; so that either wheel can be moved without being prevented by the engagement of the teeth and pawl of the other wheel. Each pawl is jointed to an adjustable piece at the end of its curved lever, and normally extends downwards; and it operates the wheel by acting on the inclined side of a tooth when depressed by a movement of its curved lever caused by the electro-magnet. A stop at the joint of the pawl prevents it from being moved aside in one direction by the resistance of the tooth; but it is free to move in the other direction, when rising after a depression—there being a small counterweight to return it to its normal position. The acting part of the pawl is, preferably, a small anti-friction roller on a pin fixed in the pawl.

Acetylene Generators.—Moss, R. J., of Birmingham. No. 4801; Feb. 26, 1898.

This is an "enlargement" upon patent No. 1254 of 1897, and is applicable to any kind of acetylene-generating apparatus wherein the carbide is contained within a holder which allows of the residue or lime getting away and mixing with the body water in the apparatus, and also of depositing on the working parts of the apparatus.

According to the present proposal, a bucket or container to collect the spent carbide or lime is fitted within the apparatus so as to either enclose or come adjacent to the holders or cages containing the carbide, and so as to keep it from mixing with the body water of the apparatus; while special carbide cages, from which the spent carbide or lime can easily escape, are constructed, and provision is made of a carrier for the carbide cages or holders and the generating chamber, which carrier rests upon a holder of the construction referred to in the 1897 patent, and is capable of being lifted into and out of position with the parts it carries.

Air-Gas Apparatus.—Lamplough, F., of Glen Ridge, N.J., U.S.A. No. 4809; Feb. 26, 1898.

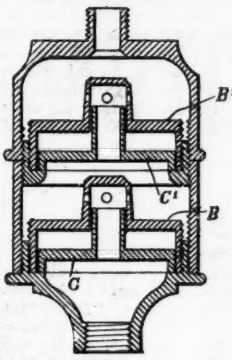
This gas-making apparatus is a combination of: A container for holding gasoline or other volatile hydrocarbon; a pump to supply the container with the hydrocarbon and with air; a lift-valve and a non-return valve at the foot of the pump; an escape-valve in the pump piston, communicating with a hollow piston-rod and handle; a gas-bottle or reservoir, to receive and contain the compressed gas or admixture of air and vapour from the hydrocarbon container; a reducing-valve apparatus in the gas-bottle or reservoir; and an outlet from the pressure-reducing apparatus to the gas-fittings.

Gas-Governors.—Sugg, W. T., of Regency Street, Westminster, S.W. No. 4901; Feb. 28, 1898.

The object of this invention is to provide a governor for high-pressure burners, in which the pressure at the point of ignition will always remain constant, notwithstanding the changes of pressure in the main. This is attained by employing a pair of co-operating valves, comprising floating discs, arranged in a casing one above the other, and working in conjunction with a pair of fixed partitions, wherein are passages for the gas—the

area of the passages being controlled by the position of the floating discs, determined by the pressure of the gas to which they are exposed.

B B^1 are a pair of fixed horizontal partitions, having hollow bell-formed portions centrally placed on the upper faces, with holes in the sides. C C^1



are discs floating respectively beneath the partitions B B^1, and having tubular portions extending into the bell portions of the partitions, and arranged in such manner as to co-operate with them and form a pair of valves, to control the passage of the gas as the discs rise and fall.

The gas enters the casing beneath the lower valve; the passing capacity of which is somewhat in excess of that of the upper valve. The latter, being regulated to the requirements of the supply, receives the gas from the first valve, and permits it to pass to the exit.

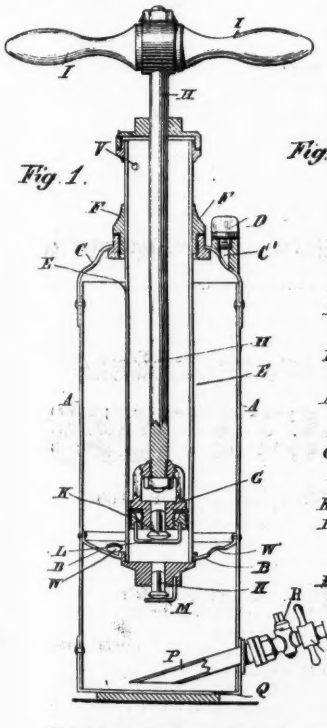
By this arrangement, the patentee claims to have "a double equilibrium valve, the separate portions of which co-operate and assist one another in maintaining the proper regulation of gas pressure, so that it will be unnecessary to employ weights."

Water-Meter.—Hallberg, D. V., of Stockholm. No. 5119; March 2, 1898.

This invention has for its object to secure the emptying of the meter as soon as the inlet-pipe is shut off, so as to avoid the risk that the meter may be burst asunder in cold weather by the freezing of the water enclosed. The proposal consists, briefly, in providing a small valve in the upper part of the meter, and so connected with the inlet-valve of the meter that, when the latter valve is closed, the former will be caused to open a small communication between the inside of the meter and the outside. In this way, the air will have free entrance into the meter, and the water will be able to escape; the bottom of the meter being made of a suitable shape for this purpose.

Gas Service-Cleanser.—Jones, H. H., of Wandsworth. No. 14,634; July 2, 1898.

This invention has for its object the clearing of gas service-pipes of the residual deposits, by forcing a suitable dissolving agent through the pipes upon the deposits, by means of air pressure from a combined air and liquid reservoir.



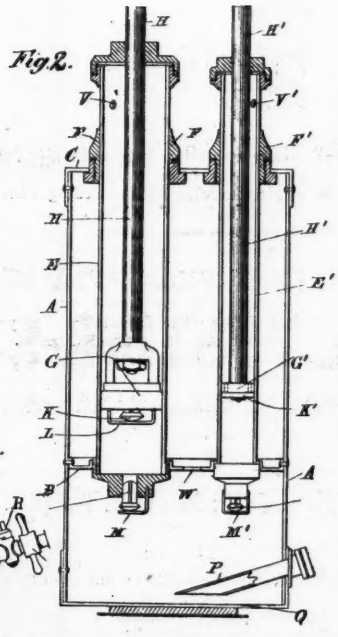


Fig. 1 is a vertical section of the apparatus in its complete form. Fig. 2 shows in section a double pump arrangement; the head of the smaller pump being shaped for the cross handle of the larger pump-rod to fit when desired.

A is the cylindrical reservoir; B, the partition-plate; C, the dome of the cylinder with a filling aperture closed by a plug D. E is the plunger cylinder, secured to the partition-plate B, and by a runner collar F to the reservoir A. G is a plunger, connected by the rod H to the cross handle I, so as to enable it to be operated from outside the reservoir. K is a valve in the plunger, with an inverted head having a limited drop motion by the check-bar L, in a similar manner by the check-bar M to that of the valve N of the partition-plate B. P is a scarf-ended pipe, arranged just above the bottom Q of the reservoir, and having its outer end provided with a tap R, from which, by a union and flexible tubing, the charge can be directed where required. V is the air-inlet to the reservoir; and W are apertures in the partition B.

Enriching Combustible Gas.—Rickman, W. B., of Leadenhall Street, E.C. No. 6748; March 19, 1898.

This "invention" is said to relate to "means of enriching combustible gas, especially such as is employed in a compressed condition for illumination of railway carriages, beacons, buoys, and the like." For this purpose, the patentee proposes to mix with the gas in various proportions acetylene, and when required compress the mixture. For effecting the mixture of the gases, he would pass them simultaneously from separate holders to a third holder which receives the mixture; loading or otherwise regulating the two holders so that they deliver the respective gases in the "desired proportion," or the meters might have "their moving parts connected by such gearing that the quantities delivered by each are in the desired proportion." No illustration of either method is given in the specification.

Treating Carbide of Calcium.—Bilbie, J., of Queen Victoria Street, E.C., and Drivet, H., of Euston Square. No. 19,786; Sept. 17, 1898.

The patentees propose a "new or improved process for the treatment of carbide of calcium," whereby it is "deodorized, perfumed, and rendered non-deliquescent." The treatment consists in sprinkling from 2 to 5 per cent. of citronella, mirbane, eucalyptus, or other essential oil on the carbide of calcium of commerce; in subsequently sprinkling on the product thus obtained from 2 to 5 per cent. of petroleum, previously purified by quicklime; and in adding to the residual mass a further quantity of about 2 per cent. of one of the above-mentioned essential oils. The object aimed at is to render the carbide unalterable to the action of air, and to prevent the excessive (and oftentimes violent) production of acetylene when the carbide is used in generators or lamps. Moreover, it is said to "improve and increase to a great extent the lighting power." The carbide treated as above described can "be manipulated and stored in a much more convenient and economical manner than heretofore, owing to its ceasing to deliquesce."

APPLICATIONS FOR LETTERS PATENT.

1520.—Brewer, T. R., "Production of acetylene gas." Jan. 23.
1538.—Koblenzer, M., "Mantles for incandescent gas-lamps." Jan. 23.
1545.—Kirkham, H., "Gas-condensers." Jan. 23.
1574.—Taylor, M., "Gas-producers." Jan. 23.
1585.—Wheatley, W. H., "Manufacture of gas." A communication from H. H. Hardy. Jan. 23.
1634.—Boult, A. J., "Burners for acetylene gas." A communication from H. E. Shaffer. Jan. 24.
1665.—Weeren, H., "Adjustable valve for steam, gas, and liquids." Jan. 24.
1711.—Hamilton, J. H., "Internal combustion engines." Jan. 25.
1724.—Meldrum, J. J., T. F., & J. W., and Clayton, F., "Mechanical stokers and furnaces." Jan. 25.
1725.—Yuill, A., "Heating of retorts." Jan. 25.
1749.—Bilbie, J., and Drivet, H., "Acetylene lamps or generators." Jan. 25.
1767.—Donat, G., "Valve applicable to vessels containing gas." Jan. 25.
1768.—Donovan, F. W. & E. W., "Use of calcium carbide." Jan. 25.
1796.—Hilberg, E., "Acetylene generator." Jan. 26.
1809.—Duderstadt, F., and Wandler, M., "Acetylene-gas apparatus." Jan. 26.
1822.—Watson, H. B. & J. S., "Water-gauge fittings for high-pressure steam-boilers, reservoirs, and the like." Jan. 26.
1858.—Taylor, M., "Regulating the charge in gas-producers and gas-engines." Jan. 26.
1986.—Altham, G. J., "Oil or gas engines." Jan. 28.
2017.—Decam, P. A., "Electric igniters for gas or oil motors." Jan. 28.
2023.—Süssmann, H., "Manufacture of incandescence bodies for illuminating purposes." Jan. 28.
2025.—Conley, O. J., "Handling or conveying coal, or similar materials," Jan. 28.

The Felixstowe District Council and the Water-Works.—The Felixstowe District Council have not yet made up their minds on the water-works purchase question. The Finance Committee on Wednesday reported that, having reason to believe that a lower sum than £65,000 would not be taken for the undertaking, they could not recommend the Council to purchase. The matter was discussed at some length; and it appeared from the statements made that the Council were somewhat in the dark as to what they were to get in return for the £65,000. But as the ratepayers at a public meeting had signified their consent to the purchase, it was determined to refer the question to a Committee of the whole Council.

The Bridlington Water-Works Award.—The question as to the validity of the award in the Bridlington Water-Works arbitration, which towards the close of last year gave rise to much excited discussion in the District Council and among the ratepayers, as reported in the "Journal" at the time, was referred to Mr. Macmorran, Q.C., who says the ratepayers are absolutely bound by the action of their representatives. If any proceedings to set aside the award are taken, they must be initiated by the Council alone. He is of opinion that the irregularities which have occurred cannot be urged as grounds for upsetting the award, because the Council by their resolution on the 25th of October last (passed against the wishes and the judgment of the Water Committee) approved of, and condoned them. There has been a technical irregularity which may, Mr. Macmorran thinks, be sufficient to invalidate the award—viz., that the statutory declarations which the Lands Clauses Act, 1845, requires the arbitrators to make were not made in due time.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by correspondents.]

"Benzols, 90's and 50's, 7½d."

Sir,—Such is the condition of the benzol market to-day, and still no action is taken towards a remedy. Some years ago when this market was down, all sorts of communications on the subject appeared in the columns of the "Journal" concerning a remedy—viz., advice as to tar as fuel, and how to use it, so as to stop the over-production. Now all seems so quiet, as if we had made up our minds to the inevitable. Advice comes to hand to enrich our gas with benzol instead of cannel coal. But I venture to say that although many managers would willingly take this course, few making under 200,000 cubic feet per day know how to apply benzol for that purpose; and should the number of works at and under this figure commence to use benzol, the present low prices for tar and benzols would soon have an upward tendency.

My object in writing is to ask, through the columns of the "Journal," if some of the engineers and managers of works who are now using tar as fuel or benzol for enriching gas will kindly give their experience in these matters in your next issue.

Feb. 1, 1899. Dare Lucem.

Flash-Point Politics.

Sir,—I am greatly astonished at the article on "Flash-Point Politics," in your issue of Jan. 24, and in particular at your appeal to party spirit and national prejudice. You have missed the mark completely in your remarks about Broxburn. There was a large meeting to hear Mr. Ure—of Tories as well as Liberals, all quietly interested and anxious to be instructed on a point they did not know anything about. In no town in Britain is there a more general interest in Imperial politics than here, or more interest in Mr. John Morley. Flash-point is an Imperial question, not local. Six years ago nobody knew anything about it except the specialists of the home and the foreign oil trade; and few know or care about it yet. But I was under the impression that nobody could have such opinions at this time of day as you express, except those who did not wish to know the truth.

The position of prejudice against high standard on account of the Scotch trade advocating it, which you wish the "Daily News" to adopt now, is just the position that the "Daily News" and every other London newspaper held not half-a-dozen years ago, as far as I can ascertain. Do you not know that the matter can be discussed apart from prejudice either against the Scotch or the Americans? Its scientific aspect has been examined and made perfectly definite by the greatest chemists of the world: Mendeleef, Victor Meyer, Chandler, Engler, Liebermann, Thörner, Stoddart, and many others—not forgetting Letheby, Attfield, and Abel for our own Home Office. Examining the subject independently, they all came to the same conclusions; there was no exception. They all acknowledged: (1) That the close test, or one that did not allow the vapours to be dissipated as they formed, was a true gauge of the lowest temperature at which danger might be anticipated; and (2) that the standard of safety should be above the highest temperatures of the climate, and above the highest temperatures of the oil in the ordinary lamps of the people.

When, however, the different investigators apply these principles to the recommendation of a definite safety point, they differ somewhat. They fixed the point from the lamps used in their own neighbourhoods at the time. Some ignored the convenience or necessities of trade; others gave them too much weight. Victor Meyer was the lowest—allowing only 2° C. above the temperature of the lamps he tried. He fixed on 91° Fahr. as the lowest that should be allowed. Liebermann demanded 122° Fahr.; Chandler, 120° Fahr. "by any test whatever." Our three chemists fixed on 100° Fahr. All practical-minded men will allow that the point must be fixed at the very lowest point that safety permits. Oil has been so cheap that even working-men's lamps have been somewhat enlarged; and Victor Meyer, testing with our lamps, would probably have found a temperature somewhat higher than he did; and 2° C. is too small a range for safety between the temperature of the lamp in ordinary condition and the flash-point of the oil, for dirt about the lamp, wick, or oil causes occasionally higher heating than he provides for.

But science provides us with fixed principles on which all scientific men are agreed; and we can apply these ourselves to the lamps of the common people and our own circumstances. Chandler, the great American expert, and Engler, the greatest of German ones in this line, came over to contradict, as expert witnesses, all they had previously said as scientific men; but it is as scientific men we are interested in them. Chandler honestly stated that he had made no new experiments since the ones that put him at the head of high-standard advocates.

The teaching of science being so definite, our laws could never have been made to contradict it as they do, had it not been for the existence of the Scotch trade. They have all along, when they did speak, said exactly what all independent scientific men had said. But their advocacy of a high standard enabled the petroleum folk to raise the cry that high standard was only another name for Protection to the home trade. When Mr. Keates or any other outsider wished the matter to be reinvestigated, the chorus of Protection! was always loud and long. Those interested in the foreign petroleum have always been very numerous, and they have always been ready to second the American demands; while those interested in the home trade have been few, and generally silent. To our immaculate, intelligent, and independent Government departments, the many are always right.

So I appeal to you, Sir, as a scientific man, to discuss the subject from a higher platform—free from party spirit, apart from prejudice either against or in favour of the Scotch, or against or in favour of the foreigner—from the region of pure science, and in the interests of the whole people.

Broxburn, N.B., Jan. 31, 1899. D. R. Steuart.

Sir,—In your remarks upon "Flash-Point Politics" in an editorial of Jan. 24, you seem to have been somewhat concerned because Mr. Ure, the member for Linlithgowshire, when addressing his constituents at Broxburn, did not talk about such "trifles as those Mr. John Morley was at the moment speaking upon before his constituents in the Montrose burghs." The fact of the two gentlemen speaking upon different subjects does not appear to me very extraordinary. Mr. Morley, as one of the self-derelict leaders of a derelict party, as you style it, possibly spoke concerning what was most interesting to himself, and what might be expected of him by the public generally from the position he lately held and the widespread curiosity regarding the why and the wherefore of his departure from that position. To Scotch people, it does not seem strange that a member for an agricultural constituency, for instance, when addressing the electors, should speak upon agriculture, nor when a member of a fishing community condescends to mention trawling. Indeed, we buy your own valuable "Journal" to learn what you have to say about gas lighting—not for politics. We have some faith in the old proverb, "*Sutor, ne supra crepidam.*"

Mr. Ure spoke on a subject which is of great importance, not only to the people of Broxburn, but to all who use oil as an illuminant. As a member of a Committee who sat long hearing evidence, and as one who showed himself highly conversant with the subject, he was well fitted in a fitting place to speak upon a matter which Parliament has thought of such importance as to appoint from time to time more than one Committee to hear evidence—from experts, traders, both buyers and sellers, gathered not only from England, Scotland, and Ireland, but from America and the Continent. After the hearing of most exhaustive evidence, the late Committee have recommended the raising of the flash-point on the ground that the use of low-flashing oil is dangerous to the community—not that American and Russian oil should be taxed, or that there should not be perfectly free trade, but that there should be comparative safety to the users of burning oil and that the lower grade oils should be classed with naphtha, which is at present under the supervision of the law.

I think you have been very happy in your selection of wheat and other agricultural products as articles of importation, as being on the same lines with petroleum. It is true, we put no embargo on the importation of wheat because it is not likely to contain any deleterious matter that would be likely to pass the skilled buyer; but we put restrictions on the importation of cattle and dead meat, and object to this country becoming the "dumping ground" for animals likely to spread disease among the stock of our farmers and cattle dealers. And just so with two other importations from America—petroleum and carburetted water gas. The people of this country do not ask for the imposition of any tax upon either of these illuminants, but only for such restrictions as will render their use comparatively safe.

I class these illuminants together as they will better illustrate what may be conceived to be the principle involved in the question. The danger arising from the use of these illuminants is one of degree. All mineral oils are more or less dangerous, as they all contain volatile hydrocarbons which form explosive mixtures when mixed with air in certain proportions; and, in a similar manner, all illuminating gases are more or less dangerous, as they all contain gases which are poisonous when mixed in certain proportions with the air we breathe.

It is unnecessary to point out what is self-evident, that the danger from the use of both forms of illuminants rises with the proportion of the dangerous constituent present in the respective illuminants—naphtha in the one and carbonic oxide in the other.

It is quite true that both illuminants may be used, under certain conditions, with perfect safety, just as cattle may be imported with perfect safety so long as sufficient care is taken that they are kept apart from other cattle and under such conditions as to prevent them transmitting disease to others. Unfortunately, it has been found impracticable to use these low flash-point oils and the poisonous carburetted water gas under such conditions as to prevent danger.

The ordinary conditions of domestic life make it almost impossible to avoid using oil in heated rooms, in lamps which might at one time have been of good construction, but which (through long use) may have become defective; gas will escape under conditions which cannot be foreseen; and imported cattle will get in such positions as to lead to the spread of disease among home cattle—all resulting in death and pecuniary loss. The public are fairly entitled to ask that they should, if possible, be protected from such dangers; and the Legislature, recognizing these facts, have already stopped the importation of live cattle, or ordered that they shall be slaughtered at the port of landing. They have also appointed Committees to advise them regarding what may be desirable legislation concerning these two illuminants.

In the case of petroleum, the Committee have agreed that 100° Fahr. flash-point ensures a fair amount of safety; and it will be the duty of the other Committee to agree upon what they consider to be the percentage of carburetted water gas or carbonic oxide, that may, with reasonable safety, be present in the gas supplied to the community.

Cheap burning oil is undoubtedly, as you say, a great boon; but it would be still greater if it were made safer. Companies and corporations supplying gas are quite aware that the public appreciate the boon, as burning oils have probably been the greatest competitor of gas. To assert, however, that the cry "with a strong Scotch accent" has for its object the sacrificing of this boon, would be as unfair as for the Scotch industry to insinuate that your motive for so strongly advocating low flash-point oil was the hope that the use of such dangerous oils would result in such a host of deplorable accidents as to lead to discarding oil in favour of gas. What appears to be a more reasonable explanation of the Scotch cry is that it has been prompted by the same motive as guided farmers in their cry about the unrestricted importation of foreign cattle. Just as the farmer suffered by this country being made the "dumping ground" of cattle which spread disease and injured them, so does the Scotch paraffin industry suffer by this country being made the "dumping ground" of low-flash dangerous oils, which lead to loss of life and property, and from which the Scotch trade suffers, owing to all such accidents being classed under the general name of paraffin accidents.

Since writing the above, I have read your leader "Killed by High-Flash Oil," which is quite on a par with what I have criticized, and betrays a spirit which I hesitated to hint at. The advocates of high-flash oil have never said that the raising of the flash-point would prevent such accidents as that described. The raising of the flash-point—or, in other words, the temperature at which the oil will form an explosive mixture with air—was intended to prevent or lessen the number of accidents from

the explosion or bursting of the lamp, which is the admitted cause of the majority of accidents from the use of petroleum. The high flash-point did not prevent the spilt oil from burning. It could not be expected that it would do so; but there was no explosion. Low-grade oil would also burn, and even more fiercely; and had the oil been of a low instead of a high flash-point, there would in all probability have been superadded the danger of the oil being spilt by the explosion of the lamp instead of the handling of it by the lad's aunt. Your statement that if the room in which he slept had been lighted with gas little Francis Morrissey would in all probability be living now, would indicate that the Scotch would not be far out were they to express an opinion as to your motive in advocating low-flashing oils, and devoting so much of your space to accidents from the use of paraffin and petroleum, neglectful of the fact that very recently much more serious accidents have occurred from escapes of gas.

Peebles, Feb. 2, 1899. ALEX ROBERTSON.

[We welcome these letters, and shall be glad to receive others on any branch of the subject. We should like our correspondents to address themselves next to the point which, as we understand, the newspaper "high-flash" party have been endeavouring to maintain—that there has been a deliberate betrayal of the public interest in the *alteration* of the method of testing kerosene for the flashing point. Has there been any change in the character of kerosene in consequence of what Mr. Ure, at Broxburn, called the "one fatal step taken on June 15, 1868?"—ED. J.G.L.]

PARLIAMENTARY INTELLIGENCE.

EXAMINER'S ROOM, HOUSE OF COMMONS.

Monday, Jan. 30.

(*Before Mr.* THOMS.)

ILFORD GAS BILL—ILFORD URBAN DISTRICT GAS BILL.

To-day the Examiner had before him the memorials complaining of non-compliance with Standing Orders in the case of the above-named Bills; the memorialists being in the first case the Ilford Urban District Council and others, and in the second Mr. G. H. Ingram and others and the Barking Gas Company. The memorial of the District Council set forth that the notices for the Bill did not, as required by the Standing Orders, state the objects of the intended application, inasmuch as by clause 40 of the Bill power was sought to repeal section 25 of the Ilford Gas Order, 1894, so far as it relates to the reduction or increase in the standard rate of dividend, and in lieu thereof to provide that the following provisions shall apply to the stocks of the Company: "The standard price to be charged by the Company for gas supplied by them shall be unaltered: Provided that if the Company increase or reduce the price charged by them for gas above or below the standard price, there shall be a reduction or increase in the dividend payable by the Company on the stocks in the original capital and additional capital as follows: In respect of any half year during any part of which the price charged by the Company shall have been a penny or part of a penny above the standard price, the dividend payable by the Company shall in respect of each penny or part of a penny by which the standard price shall have been increased be reduced below the standard rates of dividend by 2s. 6d. on every £100 of stock actually paid up, and so in proportion for any fraction of £100. And in respect of any half year during the whole of which the price charged by the Company shall have been one penny or more below the standard price, the dividend payable by the Company may, in respect of each penny by which the standard price shall have been reduced, be increased above the standard rates by 2s. 6d. on every £100 of stock actually paid up, and so in proportion to any fraction of £100." The memorial further set forth that the effect of this clause would be to empower the Company to increase the standard rates of dividend authorized by section 25 of the Ilford Gas Order, 1894, in respect of any half year during the whole of which the price charged by the Company for the gas supplied by them should have been below the standard price; and such proposed power was one of the objects of the Bill which, in conformity with the Standing Orders, ought to have been, but was not, stated in the notices. Other allegations had reference to notice of provisions dealing with the retiring of the directors and the laying of pipes, &c.; but these were not proceeded with.

Mr. LEES (of Messrs. Baker, Lees, and Co.) appeared for the District Council and their co-memorialists; Mr. SOUTTAR (of Messrs. Durnford and Co.) represented the promoters.

Mr. LEES contended that the notices which had been published did not give a proper description of what the Bill proposed. He pointed out, moreover, that under the Bill the present rate of dividend could be raised, and that as a result the consumers would be damnified.

Mr. SOUTTAR held that the allegation of the memorialists was not sufficiently specific, and that the Bill did not alter the present powers of the Company. The promoters had notified that they proposed to put in force the sliding-scale.

The EXAMINER held that the allegation had not been sustained.

After this decision, the memorial in respect of the Urban District Council's Bill was abandoned.

Lamp-Post Hydrants.—A demonstration took place last Wednesday, outside the Municipal Buildings at Battersea; the occasion being the first public trial of the combined lamp-post and hydrant, invented by Mr. W. Jones, a resident in the district. Mr. Jones had noted that in the case of a fire breaking out the firemen have frequently to spend some time in looking for the nearest hydrant; and his idea is that at stated distances such hydrants should be fitted in the base of the public lamps, which are to be coloured red in order that they may be easily distinguished. The trial was successful—water being available within 15 seconds of the hose being obtained; while the force was sufficient to throw a spray over the Municipal Buildings.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Wednesday, Feb. 1.

(*Before Justices* LAWRANCE *and* CHANNELL, *sitting as a Divisional Court.*)

London, Chatham, and Dover Railway Company v. Cable.—The Gaslight and Coke Company Claimants.

This case, which related to the seizure of gas-stoves for debt, came on for argument on appeal from a decision of the Judge at the Wandsworth County Court, as reported in the "JOURNAL" for Nov. 22.

Mr. DANCKWERTS and Mr. HODGES appeared for The Gaslight and Coke Company, the appellants; Mr. COLAM represented the High Bailiff, the respondent.

Mr. DANCKWERTS said this was an appeal by leave of the County Court Judge. The question, as regards amount, was small, but it was an important case for the appellants, as it related to the letting of gas-stoves. The London, Chatham, and Dover Railway Company had a tenant named Cable, who owed them money for rent. They obtained judgment against him; and the High Bailiff of the County Court was directed in the usual way to levy execution. He did so, and on the premises found two gas-stoves, the property of the Gas Company, and having upon them the Company's usual iron label, which was screwed on to the back of the stoves; and he took them in execution, and sold them. Before they were sold, Cable went to the County Court and told the officers that the stoves were the property of the Gas Company. Notwithstanding this, they were sold; and an interpleader summons was taken out by the High Bailiff, when the Gas Company gave notice, after the sale, that they claimed the stoves, and also damages for their wrongful sale. The Company were not aware of the sale until some time after it had taken place. When the stoves were seized, they were let on hire to Cable. They were sold for £1 14s.; though they cost £9 9s. each. The County Court Judge found that the Railway Company were not liable, as they had no notice of the claim until after the sale. As regards the sale by the High Bailiff, what was said was that he acted by inadvertence, and made an honest mistake in the *bonâ fide* discharge of his duty. The learned Judge took this view, and refused to give any damages against him. He (Counsel) submitted that, under the circumstances, this decision was clearly wrong, as the Bailiff had notice from Cable that the stoves were not his, but belonged to the Gas Company, and he ought to have kept them instead of selling them for so small an amount. He quoted *Glasspool v. Young*, which he thought exactly covered the present case.

Justice CHANNELL: Your real complaint is not so much the damages, but that you did not get the actual value of the goods.

Mr. DANCKWERTS: Yes; that is the real thing, at the bottom. If this decision of the County Court Judge stands, we have a large number of stoves out in our district, and we do not know what will become of them.

Justice LAWRANCE: Did he not give any damages at all?

Mr. DANCKWERTS: None at all.

Justice CHANNELL: But you do not want damages beyond the true value of the goods?

Mr. DANCKWERTS: No; and I shall be perfectly content with nominal damages. I only want the principle established.

Mr. COLAM submitted that the plaintiffs could not in law obtain damages against a bailiff whom a Judge found had made a mistake in the *bonâ fide* discharge of his duty. In the present case, the difficulty arose from the fact that when the sale was taking place it was the debtor who informed the Bailiff that the stoves belonged to someone else. But this nearly always happened in every case; and if a bailiff held his hand every time a debtor said this, there would never be a seizure, and the bailiff would be liable to a suit by the execution creditor for not going on.

Justice LAWRANCE said he thought the order of the learned Judge must be varied, as he was of opinion that, under the circumstances of the case, the Bailiff was not entitled to the protection usually afforded him by law, because, when he was warned that the goods belonged to someone else than the debtor, he persisted in selling them.

Justice CHANNELL considered the case was quite clear. The only question that arose in an interpleader issue as to barring an action against the Sheriff or the Bailiff was the barring of a claim for damages for the trespass, upon the assumption that the claimant had got back his goods; and in every single case in which this had been done the action against the Sheriff was barred. The effect of such a judgment in this case would be that The Gaslight and Coke Company would be bound to pay Cable's debt to the plaintiffs. But the Sheriff had no power to seize other people's goods, and make those persons liable to pay the debt. There was no authority to say that a person was entitled to seize and sell other person's goods, and then turn round and say he was not liable because he did not know they were their property. The appeal would be allowed, with costs in that Court and in the one below. He asked if any damages were assessed.

Mr. DANCKWERTS said no; but he would take any sum they would give.

Justice CHANNELL said the County Court Judge ought to have given the claimants whatever was the value of the goods that had been seized, and have barred their claim as to any damages beyond, because it was a *bonâ fide* mistake.

After some discussion,

Mr. DANCKWERTS said his learned friend had offered him 40s. damages beyond what they obtained in the Court below—namely, the price the stoves fetched; and he agreed to accept this. He also asked for costs.

Their LORDSHIPS allowed the appeal, with costs, and refused to give leave to appeal.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Saturday, Jan. 28.

(*Before Justices* BRUCE *and* RIDLEY.)

In re an Arbitration between Willard and Eastbourne Water Company.

This was a special case stated by the Umpire, Mr. Christopher Oakley, for the opinion of the Court as to whether Mr. Willard was entitled to

receive compensation in respect of underground water which had been tapped by the Company.

Mr. Willes Chitty appeared for Mr. Willard; Mr. Balfour Browne, Q.C., and Mr. Danckwerts represented the Company.

The case stated that the Water Company were incorporated in 1859, for the purpose of supplying water to the town of Eastbourne and the neighbouring districts; having power to collect underground streams of water in land belonging to them or over which they might acquire easements. The plaintiff is a market gardener and fruit grower at Polegate and Willingdon; and his lands were bounded by a stream, the water from which he had been in the habit of using for many years. The Company had recently sunk a shaft 24 feet deep and two headings, in Filching Glen, from which they at first obtained 3 million gallons of water per week; but the quantity now drawn was 1½ million gallons. On March 18, plaintiff made a claim for £1500 compensation, on the ground that his land had been seriously damaged; and the matter being referred to arbitration, Mr. Oakley was appointed Umpire. It was proved that prior to the commencement of the Water Company's works, plaintiff had always sufficient water in the stream to supply his wants on his 5½ acres; but this was not now the case. In addition to this, he had to erect a fence to protect the land. Formerly the stream was a sufficient protection to keep cattle from straying on his land. The Umpire found that the stream was a natural stream, which had flowed in a well-defined course for many years; that it was fed by various springs; that the highest perennial or permanent spring was 45 feet below the well sunk by the Company; and that there were various other springs lower down the glen, which only flowed in winter and wet weather. The Company had filled up the old water course above the engine-house, and had erected the house in or over the water course; but they had taken measures to prevent any water which might have flowed down the water course, or any other surface water, from coming into the Company's well, and had conveyed it to the glen below the well, partly by open channel and partly by pipes. Since the execution of these works, the springs had ceased to issue from the ground; and the Umpire found that much of the water which now went into the Company's well would, but for the works in question, have found its way into the stream at Filching Glen, but no such water was taken by the Company after it had reached the surface of the ground. He also found that the diminution in the quantity of water in the stream had been caused by the works; and that claimant had sustained serious injury, in respect of which he had awarded him the sum of £1450. The question for the Court was whether, on the above facts, the claimant was entitled to receive this amount of compensation.

Mr. Chitty contended that the Company could not tap a stream at its fountain head without compensating the riparian owners lower down. In support of his contention, he quoted the cases of *Bradford Corporation v. Pickles*, *Duddon v. Guardians of Chitton Union*, *Grand Junction Water Company v. Shugar*, and *Bunting v. Hicks*.

Justice Ridley pointed out that the Company had power under their Act to take underground water.

Mr. Chitty: But it does not say they can do so without paying compensation. Although they might take percolating underground water in a sponge, they could not tap water at the fountain head.

Tuesday, Jan. 31.

Mr. Balfour Browne contended that what the Company had done had not affected any stream on the surface, or any stream underground. Catch pits had been built to intercept all the surface water, which was carried by means of pipes past the engine-house and sent into the stream. All the evidence went to show that the water was percolating water, and was not in a defined channel. The right of an ordinary landowner was to sink a well on his own ground, even if the well prevented the water from getting to the surface; and, of course, every well taking water from underground must prevent water from getting to the surface. If the Company had gone to the stream or to the spring and tapped it, they would have been liable to an action; but they had not done so. They had gone 45 feet above, and sunk a well on their own land, and so prevented water going beyond it. In support of his contention that the Company had a right to appropriate percolating water, he cited the cases of *Broadbent v. Ramsbottom*, *Chasemore v. Richards*, and *Regina v. Metropolitan Board of Works*.

Justice Ridley said there was no doubt about the law; the only point was whether the Company had not intercepted the stream.

Mr. Balfour Browne said there was no finding to bear out this supposition. The finding relied upon by the plaintiff was this—that the "water would, but for the Company's works, have found its way into the stream." But this was rather in defendants' favour, as it implied that the Umpire was referring to percolating water.

Mr. Chitty having been heard in reply,

Justice Bruce, in delivering judgment, said the law was plain that where water was flowing in a defined channel, a person would have a right of action in respect of abstraction; but it was for the plaintiff in every case to make out that his legal right had been interfered with. In the present instance, the findings were consistent with there being no defined channel; and with the fact that all the defendants had done was to intercept percolating water. This being so, the plaintiff was not entitled to compensation.

Justice Ridley said he was of the same opinion. At first he had some doubts as to the findings of the Umpire; but he had come to the conclusion that there was no defined channel, and this being so an action would not lie.

Judgment was therefore given for the defendants, with costs.

Liabilities Attending the Discharge of Coal.

In the Admiralty Division of the High Court of Justice last Thursday, Mr. Justice Phillimore, sitting with Trinity Masters, had before him a case in which Mr. H. Bee, the owner of the steamship *Sir Bevis*, of Southampton, claimed damages in respect of injuries sustained by her while lying at the defendants' wharf in Deptford Creek on the 14th of October last; such injuries being caused by the alleged negligence of the defendants' servants. It appeared that while the *Sir Bevis* was being berthed to discharge her cargo of coal, a barge gridiron, just submerged, was being hoisted out of the water by means of a crane. The crane, however, was not strong enough, and the gridiron—a large baulk of timber 22 feet long, used for resting barges upon—dropped back into the water. A boatman was ordered to tow it out of the ship's way; but it fouled the propeller, and did great damage to the stern plates. The defendants denied negligence, and alternatively pleaded that the plaintiff's servants were contributorily negligent in not taking steps to avoid the gridiron, as they ought to have seen what was going on. They also alleged that the blame rested on those in charge of the ship in putting her engines ahead, with the result that the suction caused by the propeller dragged the gridiron on to the vessel. Mr. L. E. Pyke, Q.C., and Mr. Dawson Miller appeared for the plaintiff; Mr. Butler Aspinall, Q.C., and Mr. Laurison Batten, for the defendants. Mr. Justice Phillimore, in giving judgment, said he was convinced that the plaintiff's servants attended to every warning given them by the defendants, who were at home and handling their own property, while the plaintiff's servants were strangers, and never received adequate warning, either in point of time or of description, as to the mischief likely to ensue from such a baulk of timber as the one in question. Assuming that it was the ship's engines which caused the accident, the Elder Brethren were strongly of opinion, as a matter of nautical practice, that the burden was upon the defendants' servants to warn the ship of this large and inconvenient thing in the neighbourhood. There was no contributory negligence; and judgment would be for the plaintiff, with costs.

The Rating of Reservoirs.

At the Teddington Police Court a few days ago, the Southwark and Vauxhall Water Company were summoned by the Hampton Urban District Council to show cause why they should not pay rates amounting to £186. The Solicitor for the Company stated that they were prepared to pay one-fourth of the rates upon the assessment, in accordance with the ruling of the Queen's Bench Division and the Court of Appeal to the effect that reservoirs used by a water company for storing water were rateable at one-fourth only of the annual value, as "land covered with water" within the meaning of section 211, sub-section 1, of the Public Health Act, 1875. The Justices said that, under the circumstances, they could only make an order in respect of one-fourth of the amount originally assessed; but inasmuch as the Council were taking the matter to the House of Lords, they would adjourn the summons for three months.

Mr. J. Mansergh on the Birmingham Water Scheme.—At the Carpenters' Hall, London Wall, on Monday last week, Mr. J. Mansergh delivered a lecture on "The Bringing of Water to Birmingham from the Welsh Mountains." He described, by the aid of lantern views and diagrams, the great scheme he designed for the Birmingham Corporation to utilize the waters of the Elan and Claerwen, in Wales, for that city, the works connected with which have been in progress for the past six years. The lecturer gave a highly interesting address to an appreciative audience, who accorded him—on the proposal of the Master of the Carpenters' Company (Mr. J. Preston), who presided—a hearty vote of thanks. In acknowledging it, Mr. Mansergh remarked that possibly at some future time—say, fifteen years hence—London would have to follow the example of Birmingham, and think about going to Wales for water; but he was certain there was no need for introducing a Bill for the purpose during the forthcoming session. There existed, no doubt, a sentimental objection to the Thames as a source of supply; but there was not a more wholesome one in the kingdom, though the London County Council wished to condemn it.

Entertainment to the Goole Gas and Water Works Employees.—Among other innovations which Mr. M. Dunn, the Manager of the gas and water undertaking of the Goole District Council, has introduced since his appointment, is a dinner for the employees to which the members of the Council are invited, and which it is intended shall become an annual event. The first of these gatherings recently took place at the Station Hotel, Goole, when about a hundred workmen and friends assembled under the presidency of Mr. T. C. Turton, the Chairman of the Gas and Water Committee. The toast of "The Gas and Water Department" was given by Mr. Harrison, who paid a high compliment to the Manager, and emphasized the fact that since his appointment the improvement in the quality of the gas had been most marked. Mr. Turton responded, and traced the history of the purchase of the undertaking by the Council. He considered the purchase had been a very good thing for the town. Order had been brought out of chaos, and the gas-works were now up-to-date, with the result that the gas supplied to the town was much purer than it was before, and they got a great deal more out of the same quantity of coal. They would also be able to produce it much cheaper. "The Health of Mr. Dunn" was honoured; and in responding, he spoke in warm terms of the assistance rendered him by the Council.

The Pressure of Gas at Newcastle and Gateshead.—There seems to be a decided difference of opinion among the consumers of Newcastle and Gateshead as to the pressure of the gas supply. As recently reported in the "Journal," complaints have been made at meetings of the Newcastle City Council as to inferior pressure; and now Mr. Thubron has drawn the attention of the Gateshead Town Council to the insufficient pressure of the supply in the west part of the town, and asked that the Company should be communicated with in regard to the matter. Dr. Abraham, while supporting this, did not think any good result would come from complaining, and, in his opinion, things would not be better until Gateshead had a gas company of its own. Dr. Todd pointed out that the cause of deficient supply might frequently be found in the meter being too small. He had had a larger supply of gas than he really required since he had a bigger meter put into his house. Mr. Gillies said the pressure in the streets was very poor; but Alderman Lucas asserted that he had plenty of gas in his house. The Borough Surveyor also declared that the indicator in his office in the Town Hall showed an ample pressure; and Mr. Ross, who lives within 150 yards of Mr. Thubron, admitted that he had an ample supply. The proposition to write to the Company only received the support of three members. It would appear from these contradictory statements that the internal fittings of some of the consumers require attention.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held last Tuesday at the Chief Office, Horseferry Road, Westminster—Colonel W. T. Makins (the Governor) in the chair.

The Secretary and General Manager (Mr. John W. Field) having read the notice calling the meeting,

The Governor said that, in proposing the adoption of the report and statement of accounts, he must confess to a feeling of disappointment at the result of the past half-year's working. With excellent carbonizing—good both as to cost and returns—with a most satisfactory return from residuals, with equally satisfactory working expenses, and with a gratifying increase in the number of consumers, they had only just earned their statutory dividend, and carried a very small balance forward; and this with a higher price for gas than they had had for three years past. The explanation, however, was perfectly simple—it arose from the weather. The mean temperature of each of the past six months had been higher than the mean figures for the corresponding months of the past 25 years. More than this, the increase in temperature had been on the ascending scale during the half year. While in July the excess was 0·15°, in December it was 5·06°. Therefore, at what might be called the "thick end" of the half year, when variations in temperature had the most important influence upon the consumption of gas, the temperature was comparatively at its highest—or, as they might say, at its worst, from a gas company's point of view. The result of this had been an actual decrease of 2·1 per cent. in their sales of gas for the six months. It was interesting to notice—as they had found by investigation—that this reduction of output had extended to the southern part of their district, where the price of gas had not been raised; so that they could not attribute the whole, or any considerable proportion, of the decrease to the fact that the price had had to be increased. He had sometimes at half-yearly meetings, given them comparisons which brought facts home to those who had heard him; and with respect to this reduction of just over 2 per cent. in their output of gas, he might say that it was 220 million cubic feet for the half year, which was equal to a whole year's consumption of gas in several important towns—such as Tunbridge Wells, Folkestone, Gloucester, Exeter, Worcester, Eastbourne, and Bournemouth. Stated in money, the reduction in their sales had resulted in a loss of profit for the half year of from £15,000 to £20,000. The public, however, were to be congratulated upon having been enabled to effect, owing to the mild season, a saving in their gas bills for the six months, in this Company's district alone, of £75,000. He knew that it might be urged, and very fairly, that other companies who had to contend with the same meteorological conditions had shown an increase in their sales of gas. His reply was that their Company had also, in their north-western and north-eastern portions, where building was always proceeding, had a very satisfactory increase in sales. But it was in the "filled up" parts of their district, which formed so very large a proportion of their whole area of supply, that the weather conditions had told most unfavourably upon them. Although they felt this disappointment with respect to the output of gas, they had every reason to congratulate themselves on the increased area of their business. They had for this year more ordinary consumers than in 1897 to the number of 3699; and of automatic meter consumers they had an increase of 19,870. Therefore of consumers of both kinds they had an increase of 23,569; and they had also an increase of 4693 in the number of stoves used by their ordinary consumers. In fact, if they had had the usual conditions of weather, there was no reason to doubt that their gas-rental would have increased as in past years, though not with those leaps and bounds which they experienced some time ago. Turning to the accounts themselves, he reminded the proprietors that next half year they would appear in a new and much more convenient form in regard to the statement of capital and debenture accounts, which would be described in the future in four lines instead of, as at present, in four pages. This would not be the only advantage, because the whole work of the registration department and the general statistical department with respect to capital would be very much lightened and simplified. They had spent on capital account a net sum of £137,346; and the apportionment of this sum in round figures was as follows: At Beckton, they had spent on mechanical stokers of the Foulis pattern £21,000, and on retort and purifying houses and other works, £13,000—making £34,000 at this station. At Bromley, Kensal Green, and Nine Elms they had spent on oil-gas installations £6000, and the same amount at the chemical works on improvements. At Westminster, their new offices and stores had also cost them an additional £6000 of capital, and they had spent £7000 on extensions of the show-rooms. He was glad to be able to say again that there was no part of their new policy which had given better results than the installation of these showrooms in various parts of their district. Service-pipes in the distribution department had cost them £17,917; and on mains £10,883 had been spent. The expenditure on meters had been £34,548, and on stoves £24,549. This made a total expenditure of £148,718. As against this they had sold land which had produced £11,372; so that the net charge to capital for the half year had been, as he had said, £137,346. No additional capital had been raised during the six months; they had been able to meet the expenditure by means of temporary loans from their bankers. During the current month, they had issued £187,500 of ordinary stock under the Act of last year. This had realized a premium of 11 per cent., producing a total sum of £208,141; and they proposed to raise in March next, by the issue of 3 per cent. debenture stock, a further sum of £150,000. These two amounts would together be sufficient for their present requirements; but further capital expenditure, which must be necessary in the future to provide for the ever-increasing number of consumers, would have to be met by corresponding issues of capital. The gas-rental gave them an increase of £45,154, the whole of which—and, indeed, more—was the result of the increase of 2d. per 1000 cubic feet in price, and not of any increase in sales; so that he was afraid that they had no cause for congratulation with respect to the item of £45,000 odd. On the other hand, the revenue from residuals was in almost all respects satisfactory. In spite of a falling off in the yield of benzol and anthracene—items which were becoming less and less important in the list of their residuals—they had obtained an average increase of 19 per cent. over the figures of December, 1897. Coke had given them 25 per cent., and ammoniacal liquor and its products 16 per cent. These increased figures had brought them in £20,378 more than was required to cover the extra cost of the coal which they had had to purchase. It was not always, or often, that the price of coal and residuals ran together in an upward direction; and it had been very fortunate that so important an increase in the charge for coal had been met in this way. He thought he might say, without laying himself open to the charge of prophesying, that the outlook for residuals at the present time was distinctly favourable. With reference to the expenditure side of the accounts, he need not go into much detail. In common with all other gas companies, they had had to pay more for their coal. In their own case, the increase had been just under 1s. 2d. per ton. After, however, deducting the residuals, there was an actual decrease in the net cost of their coal of over 2½d. a ton, which, of course, was a very important matter for them. Wages, notwithstanding the increase recently granted to their men (with which he would deal later on), showed but a small fractional increase per ton of coal. In fact, by better working, the increase in the rate of wages had been almost entirely wiped out—a result which he considered highly creditable to their Engineers. And here he wished to interpose a short statement of a personal nature, which he was sure would give much satisfaction to those present, and to all who took an interest in Metropolitan Gas Affairs. It was a matter of common knowledge that the personal relations between the Chairman of the South Metropolitan Gas Company and himself had been for some years of a strained and dissentient character. This state of things had led to heated, and perhaps unprofitable, controversy, and had presented an unedifying spectacle to the public. He was happy to inform them that a salutary change had taken place. In September last, by the invitation of their colleague, Mr. Corbet Woodall, he met Mr. Livesey; and they entered into mutual explanations. It appeared that Mr. Livesey had long felt aggrieved at the action of this Company in the conduct of their case in the Nine Elms dispute, and had thought it was expressly adopted with the desire and intention to cause his Company injury and himself personal annoyance. He was able to give Mr. Livesey the most positive assurances that no such wish or intention had ever existed in the minds of his colleagues and himself, but that they had simply discharged, under legal advice, what they had believed to be their duty as trustees for the Company. Mr. Livesey had accepted these assurances, and they "buried the past;" and he hoped and believed that in future, without in any way sacrificing their independence of action as regarded their respective Companies, they would be able to act in harmony in the promotion of the general interests of the Metropolitan gas industries. He had never disguised from himself, or omitted to express, his appreciation of the great ability and experience of Mr. Livesey, and of the philanthropic motives which governed that gentleman's policy; and he felt sure that the proprietors would be gratified that an honourable peace between them had taken the place of past discord. At some of the gas-works in London, there was during the late autumn a movement among the carbonizing workmen for higher wages. This did not originate in, or extend to, any part of their Company's works; but after communicating with the representatives of the South Metropolitan and Commercial Companies, they considered that it was a matter in which they should, if possible, work together. Acting, therefore, in accord with the other two Companies, they granted to stokers and the men in the other classes of the carbonizing department an increase of 7½ per cent. upon their wages. He might mention that this increase gave to scoop-drivers a daily wage of 6s. to 6s. 4d., and to stokers and firemen of 5s. 9d. to 6s. The meeting would appreciate the fact that these men were in the receipt of very large pay, and that this carbonizing work was becoming a very costly matter indeed, and one that must be dealt with in a somewhat drastic fashion. If the exhausting nature of the work rendered it unfit or impossible for a large proportion of the men to perform, except at prohibitive rates, then it was only right and proper that they should be relieved from it. If, on the other hand, workmen could only be obtained at these high rates, relief must be sought for the Company; and this relief for both must be looked for in the adoption of mechanical appliances on a far larger scale than heretofore. One objection to this course hitherto had been the necessary capital outlay. But the Board thought that the time had come when it was essential for them to face this difficulty, and to apply some of their capital powers to the installation of mechanical stoking appliances or inclined retorts, as might be best suited to the construction of the existing retort-houses. In some of their buildings, they could not put inclined retorts; in others, there would be a difficulty in connection with the mechanical stoking, because of the width of the houses, and they naturally hesitated to pull down buildings which were good and substantial and well adapted for the work for which they were designed. He might add, in connection with the cost of coal and wages, that the carbonizing results for the past year had been very satisfactory; the make of gas, both from coal alone and from coal and oil, showing an improvement on the figures of the year 1897. He had again to refer to a very disappointing increase in the cost of purification. Whereas the charge should have been somewhat less than in December, 1897, the figures showed an increase of over £4000. This matter had been a considerable puzzle to the Directors, who had referred it to their Engineers for special inquiry and report. There was a material called Weldon Mud which they had been using, and which had been giving excellent results in some respects. But whether these results were not obtained at too great a cost was the problem they had to solve. The increase in the management charges was largely due to the cost of additional clerical work and other expenses in connection with the conversion of their capital. He must ask the shareholders for their kind forbearance in the matter of the issue of the new certificates, and of all the correspondence in connection therewith. This work had put an enormous strain on the Registrar's department; but he had every confidence that, with a little patience and a little more time, Mr. Reeson, their Assistant-Secretary, who had the supervision of this matter, would, with the assistance of his staff, be able to cope with this subject, and their important conversion scheme would be carried out entirely to the proprietors' satisfaction. He thought that the only other item which was at all exceptional was the sum of £2500 which they had carried to a workmen's compensation account. This was not in the sense

of a reserve fund, or like any of the parliamentary funds—the insurance or reserve funds, or even the fund for the depreciation of leasehold property. It was, in fact, an estimate of what the Board considered it was likely that the working of the new Act would cost the Company. They set aside £5000 for the year on this account, of which £2500 was applicable to the past six months. He was glad, however, to say that out of this £2500, only £262 had been actually paid; so that their estimate was, perhaps, over-liberal. Fortunately, they had had no serious accident, and it was far too soon to judge as to what would be the ultimate effect of the Act. In another large industry with which he was connected—a railway undertaking—the results had not been so good in the past half year as in the case of their own Company. He thought that they might as well continue to set aside this sum, and wait and see what the actual result of the working of the Act was. In nearly every case of personal injury, their men had accepted the allowance provided for them, which was calculated on the basis of the Act; and in the one instance where the allowance was declined, and recourse was had to litigation, the Company obtained a favourable verdict. The great object of the Directors was to avoid litigation, and to deal with these accidents in the most liberal way—carrying out both the letter and the spirit of the Act. In order to remedy what they considered rather a blot on the Act, they had made special arrangements with the workmen's sick fund, which secured to injured workmen an extension by anticipation of the weekly allowance payable under the Act after fourteen days from the date of the accident, so as to include the first fortnight after the accident. This was a plan adopted in many other instances—notably in railway cases—where the accident fund provided an allowance for the fourteen days which the Act did not make compulsory; and it was just in these first fourteen days that men perhaps felt the pinch of the want of assistance more than they did later on. He believed that this concession had been received with great satisfaction by the men. The proprietors would have observed in the accounts that there was a considerable charge for interest on temporary loans. This had been occasioned by the advisability of having recourse to their bankers (which he had referred to), in order to avoid the necessity of issuing capital before the new Act came into operation—that was to say, to avoid the necessity of issuing capital under the old form. In future all capital would be raised under the terms of their new Act. However, the interest which they had paid to their bankers, though considerable, was less than they would have had to pay in the shape of interest and dividend had they raised the money by capital in the ordinary way. The Company, therefore, had gained rather than lost by this policy. As to the results of the six months' working, the amount brought forward from the June half year was £51,854 19s. 8d., and the profit for the half year was £364,640 15s. 4d. They required for the statutory dividend of 12¼ per cent.—which, of course, was now, on the new stock, £4 18s. per cent.—£362,736 11s. 9d.; so that the amount carried forward was £53,759 3s. 3d., or rather under £2000 more than was brought from the June half year. Of course, their balance was £2200 better by the sum set aside and not spent from the amount they had provided on workmen's compensation account; but it was a close fit. This result, of course, was not so satisfactory as the Board had hoped for; but, as he said at the commencement of his statement, the weather conditions were mainly, if not entirely, responsible for it not being better. This reminded him of a matter which he mentioned at their previous meeting, and which he might now refer to again—that was, the Parliamentary Committee who were appointed last year, and who, no doubt, would be re-appointed this year, to inquire into the powers of charge of the Metropolitan Gas Companies. Up to the present time, they had received no information as to what course the Committee would take. Some years ago a similar Committee was appointed for a similar purpose; and they called for returns from the Government office, and also from the Companies, and afterwards took evidence. He had no doubt that a somewhat similar course would be pursued on the present occasion. They would afford every possible assistance to the Committee, and give them all the information they could; and he had no doubt that at the close of the inquiry, the Committee would be able fully to appreciate the value of the charges of mismanagement which had been made against their own and other Companies. They must, however, remember that if it was to be a trial at all, what was really to be put on its trial was the system of gas legislation under which they worked. This plan was adopted in the year 1876, with the view of making the interests of the Companies and the consumers identical; and the results would now be inquired into. He had no doubt whatever that the evidence which would be brought before the Committee would show that the working of the system had been entirely beneficial both to the consumers and to the Companies; but in very much larger proportion to the consumers than to the Companies. He might also say that if the system had failed, or if there had been any difficulties or mismanagement arising under it, the Board of Trade must themselves take a share in the blame, because every item of expenditure, whether of capital or of revenue, had to receive the sanction of their appointed officer; and he (the speaker) was able to say that for the last 23 years the Official Auditor of the Board of Trade had never been called upon to refuse any of the outlay which had been laid before him by the Companies, as far as he knew—certainly not by this Company, and he did not believe by the other Companies. Of course, the main features of the system were, as was well known to all present, the sliding-scale of price and dividend, and the auction clauses as applied to the raising of capital. This principle applied not only to the Metropolitan Companies, but also to nearly every Company in the United Kingdom carrying on operations under Act of Parliament. The principle, which was introduced at the time with the view he had stated, of creating an identity of interest between consumers and the public, was never intended to produce, and could not produce, an identity and equality of price in the different districts. Between the Companies north and south of the Thames and in the east the prices of gas had always shown a considerable difference, which to-day was relatively not very different from the relative prices when the system was instituted 23 years ago. With reference to the introduction of the new standard for testing the illuminating power of their gas—the 10-candle pentane lamp—the substitution of a new standard was always a matter requiring very full consideration; and in this case they had had to see that their customers as well as their shareholders were not damaged by the action of the Gas Referees. They had, he thought, now practically satisfied themselves that the adoption of the new lamp would not be injurious to either party; and they were engaged in fitting up some of the testing-places with the necessary apparatus. He sincerely trusted that the introduction of the new system would put an end to what had always been very troublesome to them—the difficulties that had arisen owing to the varying qualities of the candles by which the tests were made. They would now get a test of a uniform character, instead of one which had become obsolete. He was not going to prophesy (the mild winter had continued through a great part of January—a fact which was against them; in other respects, however, the selling price of materials had been very much the same), but he thought that they might look forward to, at any rate, as satisfactory a half year as that under review, though up to now the returns for the sale of gas had not been very encouraging. On the previous day, however, they had a 10 per cent. increase, which was a little satisfactory, especially coming the day before their meeting.

The Deputy-Governor (Mr. H. C. Ward) seconded the motion.

Mr. Galbraith wished to know where in the capital account appeared the cost of fitting up workmen's and other houses to which automatic meters had been supplied. He would also like to know the amount of capital which had been expended in this direction. He would further be glad to be informed whether any portion of the expenditure had been written off on their account. He knew that opinions differed in regard to this matter; but he thought that gold might be bought too dearly. The extra number of their consumers was very large; and it might be that the decrease in their sales of gas would have been more but for this. They looked with confidence to the Directors to guide them aright; but a word of warning from the shareholders was not amiss, and he thought that the Board ought to be very cautious how far they extended their expenditure on fittings and works over which they had very little control.

Mr. C. E. Jones said he regarded the balance-sheet which had been submitted to them as satisfactory. He was not at all in accord with the last speaker as to the results of supplying fittings to workmen's houses; nor was the experience of those who were engaged in the gas world in accordance with that gentleman's fears. He himself had every confidence that the staff would see that the fittings and the gas consumed would be a source of profit. It was also satisfactory to find, from the Governor's remarks with reference to the differences which had been in existence between himself and Mr. Livesey, that the lion and the lamb were now lying down quietly together. In the report reference was made to a further expenditure of capital to provide extensions of the Company's mechanical stoking and other labour-saving methods to cope with the labour difficulty, which had become more and more acute in the gas industry. He ventured to hope that the placing of the contracts for this work would be as far as possible with English firms, and not with foreigners.

Mr. H. Rokeby Price referred with satisfaction to the settlement of the differences between the Governor and the Chairman of the South Metropolitan Company. He also congratulated them on the consolidation of the Company's stocks, which would prove a very great advantage to the shareholders. The weather had been very unfavourable; but this was a matter over which they had no control. If they had to accept lower dividends, they must do so with a good grace.

The Governor, in reply, said he thought Mr. Galbraith must be almost alone in feeling any doubt whatever as to the vast importance and advantage to gas companies of automatic meters. As regarded the way in which the Company dealt with the cost of the meters and fittings, it was charged partly to capital and partly to revenue, under the distribution expenses; and they had this half year written off £30,000 of the amount so expended. A proper calculation was made as to the life of these meters and appliances; and they set aside a very liberal provision for replacing the cost, so that it should not ultimately fall as a burden on capital. At the end of the time they had provided for, all the meters would be their property, without any charge whatever, as their cost would have been entirely written off. He was rather sorry that Mr. Rokeby Price had suggested the idea of lower dividends, which had never occurred to himself. He hoped that if they moved at all it would be in the direction of a reduction of price, which would carry an increase of dividend. He could only conceive a further increase of price (and therefore a reduction of dividend) as being at all possible if there should be any outrageous coal combination, which would make the price of their raw material excessive for the time being. But this sort of thing always defeated itself; and sooner or later a natural order of things prevailed. They had had both dear and cheap coal; but, generally, dividends had been on an ascending scale. The time which it would take them to write off the cost of the automatic meters, &c., would depend on the number they sent out. These meters and stoves were increasing at the rate of 700 per fortnight; and the longer this state of things lasted, the better pleased they would be.

The report was then adopted; and resolutions were afterwards passed approving the dividends recommended and re-electing the two retiring Directors (Mr. John Aird, M.P., and Mr. John Miles) and the Auditors (Mr. H. W. Chisholm and Mr. Allen Stoneham).

An Extraordinary General Meeting was held subsequently, to consider the Bill to be introduced into Parliament to enable the Company "to raise additional moneys, and to purchase, take, and hold lands and for other purposes."

The Solicitor (Mr. Monier-Williams) read the heads of the Bill.

A Proprietor asked if it was necessary before the Directors raised this additional capital to call a meeting.

The Governor replied that it was. He then proposed a resolution approving the Bill, "subject to such amendments or alterations as may be made therein by Parliament and be assented to by the Directors." He explained in his remarks at the former meeting the necessity forced upon them for a further expenditure of capital on various matters. Notwithstanding the fact that, by reason of the mild winters of the past two or three years, their general business—namely, the sale of gas—had not shown any considerable expansion, they had to provide for a large addition to the number of their automatic meter customers, and also for the substitution of mechanical stoking for manual labour in the retort-houses. In addition to this, they must, of course, be prepared to meet the ordinary increase of business when normal winters came round. They had no right to infer that, because the last two or three years had been exceptionally mild, they were to have no recurrence of foggy, snowy, or frosty seasons; and they must bear in mind that when such seasons came round, it was one of the conditions of their monopoly of gas supply that they

should be in a position to give every consumer in their district the full quantity of gas he might want, whether for heating, lighting, or cooking. Their last application to Parliament for additional capital was made in 1876; and they then obtained powers to raise £1,000,000 by the issue of ordinary capital, and a further £1,000,000 by loan. The price of the ordinary stock in that year was about £200. As the auction clauses which regulated the issue of ordinary stock were then for the first time applied to the Company, there was at the date of the passing of the Bill the probability of this additional £2,000,000 of capital powers being increased to the extent of about £1,000,000 in the shape of premium capital. The actual result had been that, in addition to the nominal amount of ordinary stock which had been raised under the powers of the Act of 1876 up to Dec. 31 last (£825,000), a sum of £1,058,500 had been obtained by way of premium—bringing the total amount obtained up to £1,883,500. For the sum (£175,000) which was not raised at that date, they fully expected to obtain £507,500; and this would make, with the amount received prior to Jan. 1 last, £2,391,000 upon the issue of £1,000,000 of stock. Then as regarded the loan capital—to which the auction clauses were not applied by Parliament, but to which under the Act in connection with the Bill before them they would in future apply—they had issued by debenture stock £825,000; and in respect of this they had obtained by a voluntary application of the auction clauses principle £55,000 by way of premium, while for the amount unissued (£175,000) they expected to obtain £350,000—making with the total received up to this date £1,230,000 on debentures. These figures were very satisfactory in three ways. In the first place, the Company had been enabled to postpone, for a much longer period than they ever expected, any application to Parliament for further capital powers. In the second place, they had obtained a large premium capital upon which no interest was payable; and therefore they had been enabled, notwithstanding the increased dividends they had paid, to keep down the charge for capital per 1000 cubic feet of gas. In the third place, these large premiums could not have been obtained had it not been for the fact that the Company had from time to time made considerable reductions in the price of gas, and so had been able to divide corresponding increases in dividend, which had greatly added to the market value of the Company's stock. The matter was therefore automatic; the interest of the consumer was preserved, as well as that of the producer (the Company) by the working of the auction clauses and the sliding-scale. He therefore hoped, as he said at their previous meeting, that the Committee to which he referred would come to the conclusion that the system was a valuable one, and one which ought not to be lightly interfered with. As regarded unexhausted capital powers, their position was this: On Jan. 1 they had £437,500 of unissued ordinary stock, out of which they had already raised £187,500, leaving to be raised £250,000. They also had £350,000 of unissued debenture stock, of which they had given notice to issue £150,000 immediately. This would leave them for expenditure this year £450,000. Their expenditure during the past year on capital account had been nearly £300,000; and they owed their bankers to-day £400,000. They had therefore to provide, somehow or other, £700,000 between now and this time next year—that was, assuming they were able to keep the expenditure on capital account within last year's limits. In view of these facts, the Directors had felt that it was necessary for them to apply to Parliament at once for further capital powers; and they had accordingly lodged the Bill just described for authority to issue from time to time a sum not exceeding £3,500,000, or about the exact amount which their Act of 1876 had enabled them to obtain. He thought it must be quite clear to everyone that the lower the rate of interest which they had to pay for capital, the better it must be for the consumer and also for themselves, and the better, further, for the debenture holder, because—by raising the market value of the share capital—it improved the latter's security. The lower price at which the gas could be sold, the better was the security for the debenture holder. The Directors therefore determined to ask the proprietors to sanction the Bill submitted, which provided for the raising of the whole of the capital by means of 3 per cent. debenture stock. He had been asked why they proposed to raise the whole of the amount by debenture stock instead of partly by shares and partly by debenture stock. The answer was that the proportion of borrowed capital to open share stock in their Company was very low, only 16·6 per cent.—that was to say, their debenture capital amounted to £4,323,975, whereas their share capital was £21,642,000 under the new classification of stock. The usual practice of railway and other companies in issuing capital was to raise a certain amount of capital stock (ordinary stock), with the usual borrowing powers of 33⅓ per cent. If the Bill was sanctioned, and they raised this amount of debenture stock, they would still be considerably under the ordinary proportions of two-thirds share to one-third debenture capital; for instead of the proportion of their debenture capital being 33⅓ per cent. to the share capital, it would be only 26 per cent. It would be for the Company to decide hereafter, subject to Parliament, on the future raising of capital, whether they should not adopt the usual principle of raising so much by open stock and so much by borrowed capital. With reference to the clauses relating to land in the Bill, they had been accustomed from time to time, when favourable opportunities offered, to purchase pieces of land convenient to their works; and they might in some cases have exceeded their parliamentary powers. In these instances the land had been transferred to two individuals—generally the Governor and the Secretary—to hold in trust for the Company. It was now thought best, as they were going to Parliament, to put an end to this trust, and to vest the lands in the Company. The other clause was to enable them from time to time to purchase land that might be in the market, or that it might be necessary for them to purchase, for the uses of their undertaking. This was a very usual clause.

The resolution having been seconded,

The Governor, in reply to a question, stated that the new debenture stock would form part of the debenture stock generally. It would rank *pari passu* with the existing debenture stock; and it would be issued by auction.

On the motion of Mr. Rokeby Price, a cordial vote of thanks to the Governor, Directors, and officers was unanimously passed.

The proceedings then terminated.

The Local Government Board have sanctioned the borrowing of the money required by the Gomersal District Council for the purchase of the water-works.

EDINBURGH AND LEITH GAS COMMISSION.

Adoption of Mr. Herring's Report.

A Meeting of the Edinburgh and Leith Gas Commission was held on Monday, the 30th ult.—Provost Bennet, of Leith, in the chair. The Works Committee submitted a report, which stated: "Having considered Mr. Herring's summary of the reports of the three English deputations and the Continental one, on their recent visits to gas-works, the Committee approved thereof, and especially of the manner in which the Engineer proposed to lay out the Granton Gas-Works. On the motion of Councillor Waterston, seconded by Councillor Eunson, Mr. Herring was cordially thanked for his able reports."

Bailie Kinloch Anderson, the Convener of the Committee, moved the adoption of the minute. Mr. Herring's report had been submitted to them. They had first of all a report by each deputation submitted to themselves, and approved by them. Then all these reports were laid before the Works Committee, and, after some discussion, generally approved and handed back again to Mr. Herring, so that he might summarize them, and bring up a report in a form that they could make quite public. They did so because, in the first instance, there was a reserve upon them, under a promise they had made that when they brought up their report they would not identify any suggestion they might put forward with any of the works they had visited. The object of such a condition being imported into the arrangements could be at once seen. In the case of a company, they might criticize the works, and the manager might be called upon by his board to account for some statement they had made. The same applied to a corporation. A committee might have thought, perhaps, that, from the opinion which they had expressed, their engineer had not exactly done all that he ought to have done, or that their works were not in such a condition as they should be. In any case, they agreed that they would not identify the works in the report; and hence the summary had been put into their hands. It had already been in some of the newspapers; and it was this summarized report and the recommendations by their Engineer therein contained, that he moved the adoption of. The principle of a new gas-works they agreed to more than twelve months ago. They obtained powers during the last session of Parliament and acquired land at Granton. They had ever since been proceeding as quickly as they possibly could in the preparation of plans. They had now got the length, as all of them knew, of the excavation for the tank of the first gasholder; and that day they opened estimates for residual works to be erected there. Having resolved to go in for new gas-works, they determined that they should be of the very highest order that science could produce. They thought it most desirable—and in this they were practically unanimous—that the members of the Commission should be instructed, to some degree, as to what was being done elsewhere than in their own immediate district. Several members of the Commission went to different gas-works in England and also to the Continent. He thought that those who went on the deputations must agree that the greatest possible benefit resulted from the visits. They could read this report—he was talking largely for himself—in a very different light altogether from what they could have read it if they had not had the opportunity of seeing the different processes which were named in the report and in the recommendations by the Engineer. It was unnecessary for him, he thought, to go into the report, or to criticize it, or to comment upon it. They had it before the Works Committee lately; and they went over every section of it. They had explanations where necessary; and it was thoroughly discussed and explained by the Engineer. It now came before them as a unanimous report by the Works Committee. This was a very great undertaking which they were going into. Gas engineers, in his view, had been asleep till within the last eight, ten, or twelve years, since when electricity had pushed them pretty well from behind, and had awaked them to do something to further the interests of the industry—not only in the manufacture of gas, but in the burning of it. Many of them who had the opportunity of being on the deputations would, no doubt, witness the great area that was now employed in all new and well-equipped gas-works. He said this in justification of what was, in many quarters, criticized—namely, the large quantity of land which they had acquired for the erection of the new works. Economy would be exercised in connection with the laying out of the works openly; and the working would go on with freedom. Therefore one of the principal objections to the putting down of gas-works in any district would be entirely met by the openness of the buildings, and the ventilation of the whole works. Chemical works, which, as some of them knew, were above all considered most objectionable, could be erected in such a way that there were no odours whatever from them. Even vegetation, which was said in a high quarter to be entirely killed by the chemicals that went into the air from gas-works, existed quite close to them. This objection could be most conclusively met. At some of the gas-works they visited, they saw vegetation in its highest state of cultivation in the centre, and in the immediate surroundings, of the works. Now, to be able to produce works in the manner he had suggested—that was to say, not cramped, but well laid out, with no waste of land (for it was too valuable for them to waste, in any degree, by over-wide roads and thoroughfares)—required considerable skill. Over-ventilation was perhaps a thing to be avoided; but what was necessary in this direction Mr. Herring had provided for in his report. The various parts of the structure were, in the report, under different headings. The increasing demand for gas was, to them, in promoting this gigantic undertaking, exceedingly satisfactory. The consumption still continued to increase. During the period since May 16, their increase had been over 3 per cent. If they went back for nine years, when their great competitor electricity, he might say, was first introduced to any extent, the increase was something like 3½ per cent.; and the average increase in the gas undertakings in the country was 3½ per cent. So that they, at all events, were standing pretty well up to their former average. If this increase went on, all the land they had secured would, in the course of some 35 or 40 years, be required for the purposes for which they bought it. There was a little bit at the west-end which they all knew would not be immediately dealt with. But the first large part would be earlier required than they originally calculated upon; and the whole would be wanted within the period he had named. In the concluding paragraph of the recommendation of the Committee, they cordially thanked Mr. Herring for his able report; and he

most heartily endorsed this vote. He thought they were all indebted to Mr. Herring for the very great amount of personal trouble he had taken in the matter. No doubt, some might say it was his duty; but there were different ways of doing duty, and Mr. Herring had done his most satisfactorily to them all. He might say that they had been exceedingly fortunate, at this juncture, when they were compelled to go in for new gas-works, in having had Mr. Herring as their Engineer. He undoubtedly stood in the front rank of his profession. When he spoke of gas engineers having been asleep so long, he could not refer to Mr. Herring as being one of the old school. He was one of the new school; and he had done perhaps as much as anyone to wake up his colleagues. He did not desire to say anything further; but he hoped that they would accept the report as unanimously as the Works Committee did. In fact, he scarcely could doubt but that it would be so, after the inquiries made and the explanations given in the Committee.

Mr. Waterston, in seconding the motion, said he heartily endorsed all that had been said about their Engineer. He thought Mr. Herring deserved their best thanks for what he had done. But he did not quite agree with the remarks of the Convener about the land and the deputations. He considered that they might have saved hundreds of pounds upon those heads. He thought, however, that no one could come to any other conclusion than that Mr. Herring had proved himself master of the situation. The mode in which he proposed to lay out the Granton works was highly commendable. He heartily expressed his own gratitude to Mr. Herring for the excellent report he had presented to them.

Mr. John Jamieson said he did not rise for the purpose of continuing the discussion. He wished to mention, regarding what Mr. Waterston had said about the deputations, that he rather endorsed what the Convener had stated. There were various points they would not have been able to understand but for the visits to the gas-works—under, of course, the able guidance of their Engineer. There was, for instance, the subject of inclined retorts. He thought they would all agree that they would be a very great advantage to them. It would have been a surprise to him if, after what they had seen, Mr. Herring's conclusion had not been to adopt inclined retorts in their new works.

The motion was adopted unanimously.

THE GASHOLDER ACCIDENTS IN AMERICA.

We learn from New York papers just to hand that the inquiry into the circumstances attending the accident to the large holder of the Consolidated Gas Company, which resulted in its wreck, as shown in the "Journal" last week, and unhappily the loss of eight lives, was concluded on the 24th ult.

The holder was constructed by the Logan Iron-Works Company; and Mr. C. L. Rowland, one of their engineers, testified before the Coroner that the work had been carried out in strict accordance with the terms of the specifications. He said he had examined the tank after the accident, and had discovered an indentation from the inside on two of the plates. He was positive that there was no gas in the holder when the collapse occurred. Asked if it would be possible for a person to enter the works, climb to the top of the tank, drop dynamite into the water, and cause an explosion, he said it would, after dark; but there was a watchman upon the premises who had instructions not to admit strangers. He acknowledged that there had been some trouble on account of the employment of non-unionists on the work of constructing the holder; but he declined to say that the vessel was wrecked by an explosion of dynamite. He had no faith in this theory. The night watchman (a man named Jordan) stated that he had seen two men, who looked like mechanics, standing in front of the tank, and looking at it, just before the accident. He did not know what became of them; but he believed one of them was killed. Several workmen employed about the premises were examined; but not one was able to offer any evidence which could guide the Jury in giving their verdict. Captain D. L. Hough, a Volunteer Engineer, said he was a civil engineer and contractor, and had been employed by the Gas Company to make a critical examination of the plans on which the holder and tank had been constructed. He told the Jury that the holder had been put up in accordance with the most approved practice, and that he could find no fault with its design. He said its destruction might have been caused by an explosion of dynamite either inside or outside the tank. The Jury returned a verdict to the effect that the unfortunate victims of the disaster had met their death by asphyxia caused by drowning; and that "the construction and materials of the tank were in accordance with the plans and specifications, and that the workmanship thereon was of good character." They suggested: "In view of the fact that neither the design nor the construction of such gasholder tanks is under the official supervision of any city department, we recommend that all such work in future shall be subject to proper municipal supervision and control." The Coroner then discharged from custody the Company's Chief Engineer (Mr. W. H. Bradley) and the Contractor (Mr. W. J. Logan,) who, it may be remembered, were arrested immediately after the accident, but liberated on bail to the amount of $10,000 each pending the inquiry.

Further particulars have also reached us in regard to the fatality at the Poughkeepsie (N.Y.) Gas-Works, to which reference has been already made. About five o'clock in the afternoon of the 16th of December, there was a tremendous explosion, followed by a tower of flame 100 feet high. The effect is thus recorded by the "New York Herald:" "The walls of the works were parted and torn in every direction, and the roof was crushed into fragments and scattered around the vicinity, with fragments of the timbers and bricks and masonry. Nothing was left standing of the main building except a section of the wall on the south side, which rested against a bank of earth. A hissing wall of fire hurled itself skyward for an hour. The big gasometer holding 90,000 cubic feet of gas, slowly sank as the gas from the broken mains feeding it was consumed, until the iron roof rested even with the ground, and there was no more gas left to be burned. The firemen could do nothing to check the fire. . . . The force of the explosion was north and west. In this direction for half a mile there is not a house with more than a few panes of glass. In a street a quarter of a mile from the gas-works the windows in a whole row of stores were blown in. The damage done to buildings is estimated at some thousands of dollars. The loss on the gas-works cannot be estimated, but will approximate $25,000 or $30,000." There were in all five men on the premises at the time of the occurrence; and three of them were killed. Neither of the survivors could say anything definite about the explosion, except that they were suddenly surrounded by a mass of flame and were conscious of a great shock. One man said he was washing his hands at one end of the building, when he felt everything giving way, and he blindly pushed his way through the *débris* until he was safe. There is no insurance on the property. The reserve holder, with a capacity of 10,000 cubic feet, was intact, and from it a small supply of gas was obtained. For seven or eight years gas at these works has been made from naphtha. The Manager (Mr. J. H. Hadden) states that the trouble was caused when the night shift came on. The relief holder in the generating-room was full of gas, and they were making it fast. The gas was sent extra quickly into the purifier, and the strong current blew out the water in the boxes, and allowed the gas to escape. It appears that in the construction of the works a passage had been left between the purifying-room and the boiler-room; and the escaping gas was ignited by some lights burning in the latter, with the result that the explosion followed.

SALES OF STOCKS AND SHARES.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Mr. Alfred Richards sold, by order of executors, several parcels of debenture and ordinary stocks of gas and water companies. The first lots consisted of some of the Commercial Gas Company's 4½ per cent. perpetual debenture stock, which was sold at the rate of £146 per £100 of stock; yielding the purchaser £3 1s. 8d. per cent. Some old stock of the Company was next offered, and was sold at an average price of £321 13s. 4d. per £100 of stock; yielding the buyer £4 3s. 11d. per cent. (It may be mentioned that similar stock was quoted on the Stock Exchange on the day of the sale at £310 to £315.) A parcel of new stock, earning 10½ per cent. dividend, was sold at the rate of £243 per £100; returning £4 6s. 5d. per cent. A few fully-paid (£10) shares in the Alliance and Dublin Consumers' Gas Company, the last dividend on which was at the rate of 10½ per cent. per annum, were sold for £23 apiece; yielding £4 11s. 4d. per cent. Some new ordinary stock of the Crays Gas Company, on which 5 per cent. dividend has been paid, fetched an average price of £113 19s. 2d. per £100; yielding £4 7s. 9d. per cent. A few ordinary £10 shares in the Lowestoft Water and Gas Company, the last dividend on which was at the rate of 5½ per cent. per annum, were bought for £14 12s. 6d. each; yielding £3 11s. 10d. per cent. Some £5 shares (7 per cent.) in the Ilminster Gas Company were sold for £7 12s. 6d. each; yielding £4 11s. 10d. per cent. A few £10 fully paid "A" shares in the Waltham Abbey and Cheshunt Gas Company, the last dividend on which was at the rate of 7 per cent. per annum, were sold at £18 apiece; yielding £3 17s. 9d. per cent.; some "C" shares, of the same nominal value, but earning 5 per cent. only, fetching £11 15s., and returning the purchaser £4 5s. 1d. per cent. Some £5 shares in the Goring and Streatley District Gas and Water Company were sold for £2 5s. apiece. A small parcel of "B" (£10) shares in the Grays Gas Company, the last dividend on which was at the rate of £5 12s. per cent. per annum, was disposed of at £12 10s. per share; yielding the purchaser £4 9s. 7d. per cent. for his money. Some "B" stock of the Tottenham and Edmonton Gas Company, entitled to a dividend of 4½ per cent. per annum, was sold at the rate of £110 per £100 of stock; yielding £4 1s. 10d. per cent. A few fully-paid £5 ordinary shares in the Upton-on-Severn Gas Company were bought for 17s. apiece. Some fully-paid original (£5) shares in the West Ham Gas Company fetched £12 15s. each; yielding the purchaser £3 18s. 5d. per cent. Consolidated "B" stock of the Croydon Gas Company, the last dividend on which was at the rate of 11 per cent per annum, was sold for £277 per £100; yielding £3 19s. 5d. per cent. Ordinary 5 per cent. stock of the Guildford Gas Company fetched £123 per £100; returning the investor £3 19s. 5d. per cent. The last lots offered were some new £10 shares (7 per cent.) in the Worthing Gas Company, which were bought for £17 5s. each; yielding the purchaser £4 1s. 2d. per cent. The total amount realized by the sale was £8632 17s. 5d.; the purchasers in nearly every case taking the dividend accruing from July last.

As the Grimsby Corporation have at present under consideration the advisability of purchasing the local gas and water undertakings, special interest attached to a sale by auction of gas stock and water-works shares yesterday week. £200 "Class C" Stock Gas Company, realized £420; and £120 "Class A," realized £254; while 10 £10 shares, fully paid, in the Water Company, realized £23 each. At a local sale by auction on the same day, 25 original shares of £15 each in the Cirencester Gas Company realized from £32 15s. up to £34 15s. per share; and 18 5 per cent. shares of £6 5s. each produced £7 10s. each. At a recent sale, seven £10 shares in the Cranbrook Gas Company realized £18 10s. each, which is the highest price yet obtained for these shares. At the Mart, Tokenhouse Yard, last Wednesday, Messrs. Fox and Bousfield sold some £10 ordinary 7 per cent. shares in the North Middlesex Gas Company at £16 to £16 5s. each. In Dundee, last Tuesday, 73 shares of £1 each in the Newport (Fife) Gas Company, were sold by auction at £1 1s. 6d. each.

Serious Fracture of a Gas-Main at Windsor.—On the evening of Friday, the 27th ult., an explosion of gas occurred in the Railway Arms beerhouse, Windsor. The lower part of the house was much damaged; but fortunately no one was injured. The Manager of the Gas-Works (Mr. J. Wadeson) promptly had men on the ground to ascertain the cause of the leakage; and, after much labour, it was found that the 6-inch main which supplies the Castle with gas, and runs near the beerhouse, had cracked right across, and gas was escaping from it in large quantities. It was repaired with the utmost speed; but it is estimated that upwards of 55,000 cubic feet of gas had escaped. The ground in the vicinity of the main has been considerably disturbed of late, and, being largely composed of chalk, it allowed the gas to get away freely to a great distance. Mr. Wadeson thinks the crack in the main must have been caused by a settlement; and that it may have occurred only a few hours previous to the explosion.

BRENTFORD GAS COMPANY.

The Half-Yearly Report and Accounts.

In the report which the Directors of the Brentford Company will present at the meeting of shareholders on the 10th inst., they state that, notwithstanding the mildness of the winter, the increase in the sale of gas for the past half year has been 4·26 per cent. over the corresponding period of 1897. The consumers of gas by the automatic meter system continue to increase; the number of these meters in use in the Company's district at the close of last year being 15,233, as against 11,421 on Dec. 31, 1897, or equal to an increase of about 33 per cent. for the year. The sale by auction of £15,000 of the Company's new stock, 1881, which took place on the 15th of July last, realized £30,320 5s.; being an average of £208 16s. for every £100 of stock sold. The £15,000 of similar stock sold by auction on the 23rd of November realized £30,195 7s. 6d.; giving an average of £201 6s. 1d. per £100 of stock. The new manufacturing plant at the Southall works is now in process of completion, under the supervision of the Company's Engineer and Manager (Mr. J. Husband), and will shortly be in active operation. The works and machinery at the Brentford and Southall stations are in efficient order. The sum available for distribution is £64,693; and the Directors recommend the declaration of the following dividends, subject to income-tax: At the rate of 5 per cent. per annum on the preference stock, at the rate of 12 per cent. per annum on the consolidated stock, and at the rate of 9 per cent. per annum on the new stock, 1881.

The accounts accompanying the report show that a sum of £18,403 was spent for capital purposes in the latter half of last year; £5531 being for new buildings and machinery, £3455 for mains and services, and £9417 for meters and stoves—bringing up the total expenditure on capital account to £975,390. The total receipts to Dec. 31 being £981,140, there is an unexpended balance of £5750. The revenue account is satisfactory. The receipts for gas amount to £117,496, as compared with £112,785 in the six months ending Dec. 31, 1897; the rental of meters and stoves produced £9209, against £7780; and residuals realized £25,703, against £21,331—the total revenue being £152,452, as compared with £141,931. On the other side of the account, coals cost £53,672, as compared with £50,348; and the total manufacturing charges were £77,549, against £75,860. The salaries, however, have been reduced from £1338 to £1272, and the carbonizing wages from £8055 to £7679. Distribution came to £15,875, against £12,949; management, to £4972, against £4764; and the total expenditure, to £109,032, against £103,827. The balance carried to the profit and loss account is £43,420, whereas for the latter half of 1897 it was £38,104. The statements as to the Company's manufacturing operations show that 71,197 tons of Newcastle coal, 775 tons of cannel, and "Solar" oil equal to 10,188 tons of coal, were used for the production of gas; the quantity made being 851,501,000 cubic feet, of which 795,214,000 cubic feet were sold and 808,714,000 cubic feet accounted for. For the latter half of 1897 the figures were: Gas made, 817,021,000 cubic feet; sold, 762,708,000 cubic feet; accounted for, 775,708,000 cubic feet. The estimated quantities of residuals made during the six months ending Dec. 31, 1898, were as follows: Coke, 47,951 tons; breeze, 5965 tons; tar, 814,910 gallons; ammoniacal liquor, 2,141,964 gallons.

PROVINCIAL GAS AND WATER COMPANIES.

We commence to-day our usual notes on the progress made by Gas and Water Companies in various parts of the kingdom whose reports and accounts come to hand about this time of the year.

Gas Companies.

The report of the Directors of the Basingstoke Gas Company, which was presented at the annual general meeting yesterday, showed the balance on the profit and loss account to be £2768 The Directors recommended payment of dividends at the following rates per annum: On the "A 1" capital, 10 per cent.; on the "A 2" capital, 5 per cent.; and on the "B" new ordinary stock, 7 per cent. At the close of the general business, an extraordinary meeting was held to authorize the raising of £5000 of new "B" capital, to meet the proposed outlay in extending the manufacturing plant.

The Directors of the Bristol Gas Company, in the report to be presented at the general meeting on the 17th inst., announce that the revenue account for the six months ending Dec. 31 shows a balance, after providing for the dividend on the ordinary stock and interest on the debenture stock, of £1444; while the balance on the profit and loss account stands at £14,642. The accounts accompanying the report show that £19,807 of capital was spent in the past six months; £4533 being for new stoves. The receipts for gas amounted to £100,549, as compared with £97,078 in the second half of 1897; the total revenue being £134,636, against £125,347. The expenditure was £104,687, against £97,349; and the balance carried to the profit and loss account is £29,949, as compared with £27,998. A dividend at the rate of 5 per cent. per annum is recommended.

The report and statement of accounts of the Calverley and Horsforth Gas Company for the year ending Dec. 31 last states that the balance of net profit, after deducting the interim dividend (£1504), and providing for interest upon loans, amounts to £3176, from which the Directors recommend the declaration of the statutory dividends upon all stocks and shares. The Directors report a steady increase in the consumption of gas, and a continued demand for prepayment meters.

The half-yearly meeting of the Cambridge Gas Company was held on the 30th ult.—Mr. E. H. Parker in the chair. The report presented by the Directors set forth that, owing to the increased cost of raw material and the necessity for modernizing the existing plant, they had been compelled to increase the price of gas from 2s. 10d. to 3s. per 1000 cubic feet. The prepayment system had been adopted in the half year covered by the report, and had been well received. The claims against the Company which had arisen in connection with the fraudulent issue of mortgage and stock certificates by the former Secretary had been compromised. The Directors recommended dividends at the rates of 10 and 7 per cent. When moving the adoption of the report, the Chairman stated that the revenue account showed a balance of only £778 to be carried to the profit and loss account; but this was explained by the expenditure which had been incurred upon renewals to a retort-house and a purifier, which came to £4003. A sum of £3879 had been transferred from the reserve fund to the profit and loss account; but the fund still stood at £3879. The general balance was £12,680; but the payment of the dividend proposed would absorb £4400 of it. With regard to the general working, the slot-meter system had proved very satisfactory. There were 92 of these meters in use; and there was still a great disposition to have them. In the month of August, £40 was received in pennies from prepayment meters; and he thought the Company would do good business with them. They had also been very successful with cooking and heating stoves; and since the recent exhibition they had fixed 60 more of these appliances. The total defalcations of the late Secretary reached £13,455; and the loss to the Company thereby amounted to £8402. Mr. Wood seconded the motion; and, after some discussion, it was carried. It was then resolved that the Directors' recommendation with respect to the dividend should be adopted; that the paid-up £10 shares in the Company should be converted into consolidated stock; that the sum of £32,000 of 3½ per cent. debenture stock should be raised to pay off existing loan capital; and that the half-yearly meeting of the Company should be held within six weeks of the end of the financial period (June 30 and Dec. 31). At the close of the ordinary meeting, a special meeting was held at which the shareholders approved of the Bill to be introduced by the Company into Parliament this session, for the purposes indicated in the "JOURNAL" for the 17th ult. (p. 125).

In the report of the Directors of the Coatbridge Gas Company for the six months ending Dec. 31, they express their pleasure in stating that the affairs of the Company are in a very satisfactory condition. The sales of gas amounted in the aggregate to 50,042,700 cubic feet, which shows the considerable increase of 4,968,029 cubic feet over the corresponding period of 1897. Automatic meters account for nearly 2 million cubic feet; the remainder of the increase being attributable in a great measure to the increasing demand for gas for cooking and heating purposes. The number of consumers increased during the half year by 256, of which 192 were due to automatic meters; and the value of the new meters supplied to these, amounting to £367 11s. 10d., together with the sum of £102 12s. 2d. for stoves and grillers, and £21 13s. 6d. for pipe extensions, was charged to capital. The total revenue was £8035; the profit being £2056. After deducting £183 for interest on mortgages, &c., the remainder, added to the balance of £818 brought forward, makes £2691 applicable to dividends. The works and plant (under Mr. T. Wilson) have been maintained in a thoroughly good state of working efficiency. The unaccounted-for gas was at the rate of 11·67 per cent.; and the average illuminating power of the gas supplied was 23·25 candles. The Company's Provisional Order, authorizing the raising of £20,000 of additional capital, was duly granted; and in terms thereof, 500 of new 7 per cent. £10 shares, bearing dividend as from Jan. 1, 1899, were sold at the upset price of £12 per share. The total sum realized was £7191 15s.; the premium being £2191 15s. From this the costs of the Order and sale have been paid; leaving £1857 to be carried to the capital account. The average price per share amounted to £14 7s. 0·04d.

The half-yearly meeting of the Derby Gas Company was held last Friday. The Chairman (Mr. Henry Swingler), in moving the adoption of the report, said that with regard to the revenue account, the manufacture of gas had cost £37,311, against £35,953 in 1897, but coal was 8d. per ton dearer, and accounted for £1732. In addition to this, they had made and sold 6½ million feet more gas, which meant that this extra gas had cost the Company practically nothing. Adverting to the sale of residuals, the Chairman mentioned that they were receiving more for coke than they might have anticipated, and what was more, it was practically all sold—a state of things which very rarely prevailed. The increase in the sale of coke was £1560; and in sulphate there was an increase of £1185. But the receipts for tar had decreased by £264. After paying the largest dividend they were permitted to do, they were able to add £222 to the reserve fund; making it, with the investments already completed, £11,538. The report was adopted.

During the past half year, the Whitworth Gas Company received £2521 from the sale of gas—an increase of £145 compared with the second half of 1897. Owing to the construction of new retort-settings (which have fully answered the expectations of the Directors), the net profits do not quite reach the amount required to pay the usual dividends of 10 and 7½ per cent.; and consequently £85 will have to be taken from the reserve fund for this purpose—leaving the fund at £1200.

The statement of accounts of the Yeadon and Guiseley Gas Company for the half year ending the 31st of December last shows that the total receipts during this period amounted to £5582; the expenditure on revenue account being £4201—leaving a balance of £1381. The Directors recommend the payment of the maximum dividends of 10 per cent. on the consolidated stock (£11,725), and 7 per cent. on the new shares (£17,600). This will absorb £1202, and leave a balance of £179 to be carried forward.

The half-yearly accounts of the York United Gaslight Company (noticed last week) were submitted to the shareholders on Thursday by the Chairman, Mr. J. R. Hill. In moving their adoption, he said the profits in the June half of last year exceeded the amount required for dividend by nearly £1000; and the profits of the past half year exceeded the December half of 1897 by £257. The present low prices charged for gas—1s. 11d., 1s. 9d., and 1s. 8d. per 1000 cubic feet, according to consumption—could scarcely be equalled in any town in the kingdom; and the Directors felt that the shareholders might rest assured that no ordinary competition could make much headway against such prices. It was true that they were on the eve of meeting their new competitor, the electric light, but this light had not materially affected the use of gas in any town where the two had come in contact. The business continued to make satisfactory progress; the gas consumption showing an increase of 4 per cent. One feature which had been more than usually developed during the past six months was the increased use of gas-engines; the Company having now on hand orders to supply no fewer than eight engines of a combined capacity of 90-horse power. The North-Eastern Railway Company, too, had just given an order to light their extensive new workshops at Holgate. The Chairman also referred to the resignation of the ex-Chairman (Mr. J. F. Taylor), who had been a Director of the Company for 38 years, during 19 of which he occupied the position of Chairman. The motion was

adopted; and a dividend at the rate of 5s. per share upon both old and new was declared.

Water Companies.

The Directors of the Boston Water Company, in the report presented at the annual meeting last Tuesday, stated that there was an increase in the water-rentals during the past year of £86 11s. 1d. The drought did not affect the Company to any great extent—no restriction being placed on the consumption; and the minimum quantity in store was above the minimum of 1897. A sum of £578 was expended on the construction of a filter-bed, and £1523 in the reinstatement of the mains. On account of this special expenditure, the Directors purposed taking £1000 from the reserve fund, which, with the balance, would leave £2538 available for distribution. Out of this they proposed to pay a dividend of 8 per cent., and carry forward the balance of £138. This was agreed to.

At the meeting of the Cambridge Water Company on Monday last week, the Directors announced in their report that they had deemed it desirable to create, under section 122 of the Companies Clauses Consolidation Act, 1845, a contingency fund, and had decided to transfer thereto the sum of £900 from the balance on the revenue account. They recommended that a dividend for the past half year on the consolidated stock issued under the Acts of 1853, 1855, and 1866, at the rate of 10 per cent. per annum, and upon the consolidated stock issued under the Act of 1886, and the amount paid on allotment of new shares for the six months ending Jan. 6, 1899, at the rate of 7 per cent. per annum, be paid, less income-tax. The Directors added that the final settlement of certain claims arising out of the fraudulent transactions of the late Secretary, referred to in previous reports, was still unavoidably postponed; but it was anticipated that a settlement would be effected before the next meeting. The Chairman (Dr. Perowne) moved the adoption of the report; and the motion was carried. A little scene was created on the proposal to re-elect Dr. Robinson and Mr. W. E. Lilley as Directors; a shareholder (Mr. Matthews) charging both these gentlemen with "culpable neglect in signing bogus certificates without first seeing the transfer or cancelling the old certificates," thereby, he said, causing the Company to lose some thousands of pounds, and innocent sufferers to be fearfully robbed and badly treated. The voting, however, was ten to one in favour of Dr. Robinson; while with regard to Mr. Lilley the only dissentient was the complaining shareholder.

Mr. E. Barton presided at the annual meeting of the Carnforth Water Company, which was held last Thursday. The report showed a net profit on revenue account of £904; and it was agreed to pay 7 per cent. dividend, and carry forward the balance. The extension of the reservoir has been satisfactorily carried out, at a cost of about £1200, reducing the reserve fund, which now stands at £755. The report was adopted.

At the meeting of the Colne Valley Water Company next Tuesday, the Directors will report a profit of £6687 for the six months ending Dec. 31, 1898. The amount available for distribution will be £4592, out of which the Directors will recommend the payment of a dividend at the rate of 5 per cent. per annum, less income-tax; leaving £390 to be carried forward.

The annual report of the Directors of the Weardale and Shildon District Water Company states that the net revenue account amounts to £43,343, including £7529 brought forward. Deducting the interim dividend paid in July, amounting to £15,000, and income-tax, £1136, there remains an undivided profit of £27,207. The Directors recommend the payment of the following dividend, free of income-tax: 13s. 9d. per share on 24,000 fully-paid shares, making an average for the year of £5 5s. per cent. per annum. This will absorb £16,500, and leave to be carried forward an undivided profit of £10,707. In order to meet the steadily increasing demand for water, one of the pumping-engines has been duplicated, and a second line of 9-inch pipes has been laid. A large number of short extensions were made to new houses during the past year.

The half-yearly general meeting of the York Water Company was held last Thursday—Alderman J. Sykes Rymer presiding. The Chairman, in moving the adoption of the report (see *ante*, p. 262), said the accounts enabled the Directors to pay the maximum dividend, and carry forward £515. The motion was seconded by Mr. W. H. Cobb, and, after some discussion, was carried. The dividends recommended were declared.

GAS AND ELECTRIC LIGHTING AFFAIRS AT LEICESTER.

At the Meeting of the Leicester Town Council last Tuesday, the Gas and Electric Lighting Committee reported that during the six months ending Dec. 31, 72,600 tons of coal were carbonized. The quantity of gas made was 743,084,000 cubic feet, as against 729,888,000 cubic feet in the corresponding period of the previous year; being an increase of 13,196,000 cubic feet, or 1·80 per cent. The average illuminating power of the gas for the same period had been as follows: Belgrave Gate works 17·61 sperm candles, Aylestone Road works 17·79 sperm candles. The Committee also had the pleasure of reporting that the whole of the plant and apparatus included in the important extension of No. 2 section of the Aylestone Road works, carried out during the past two years, was put into operation in November last, and was working in a most satisfactory manner. This increased the total productive capacity of the works to at least 6½ million cubic feet per day—making, together with the 2½ millions the Belgrave Gate works were capable of producing, the total productive capacity of the undertaking about 9 million cubic feet per day. The question of increased storage had still to receive the attention of the Committee. The total output of electric current from the central station for the half year ending Dec. 31 was 302,531 units. Extensions and alterations of the apparatus at the electric lighting central station were considerably advanced; and the station would soon be fully equipped. Alderman Lennard moved the adoption of the report. He said that within the last three months complaints had been made as to the quality of the gas; but he wished to point out that the illuminating power had been increased in the past year by one candle over the previous year; and the same increase was made the year before. To do this had involved extra expense; and they now used better coals and had better purification than ever before. Notwithstanding this, many people thought they were getting bad gas, whereas the whole fault rested with the fittings. The same gas was supplied to everybody, and 99 out of every 100 consumers were satisfied. The report was adopted.

THE QUESTION OF AUXILIARY GAS-WORKS FOR COVENTRY.

A minute presented by the Gas Committee at the meeting of the Coventry City Council last Tuesday drew from Mr. Andrews, the Chairman, an interesting statement regarding the consumption of gas in the city, showing the great influence which the condition of the cycle trade has on the prosperity of the gas undertaking. The minute was to the effect that, by the Corporation Gas Act of 1898, the Council were empowered to purchase about 38 acres of land at Foleshill, and to stop up and divert certain footpaths crossing those lands. These powers must be exercised within three years of the passing of the Act. The Committee therefore recommended that they be authorized and empowered to purchase the land in question, and for this purpose to enter into negotiations and agreements, and, if necessary, to take steps to have the purchase money and compensation determined under the compulsory clauses of the Lands Clauses Acts. In addition, there would be the expense of fencing, diverting the footpaths, and straightening the channel of a stream which crosses the land. This is estimated at about £200. Alderman Andrews, in moving the adoption of the recommendation, recapitulated what he said eighteen months ago, when he moved the adoption of the Bill which they were then proposing to promote. He stated at the time that it was the settled policy of the Gas Committee, during the fourteen years the Corporation had been in possession of the undertaking, to keep down the capital account, to reduce the price of gas especially for manufacturing purposes, to provide an annual sum for the relief of rates equal to about 6d. in the pound, and to add any further sums available to the sinking fund. He further pointed out that they had experienced a sudden increase in the consumption of gas, equal to about 24 per cent. in a single year, and that it was necessary to look a little ahead, and, if it were required, to provide auxiliary gas-works in order to cope with the probable increased demand. The position they were now in was this: After having had a sudden increase of 24 per cent. in one year, there had been no increase at all. Apparently at the end of the year's working, instead of an increase there would be a decrease; so that the consumption of gas in Coventry would probably be smaller than it was two years ago. In face of this, the Gas Committee did not recommend at present any expenditure of capital on auxiliary works, except for the purchase of land, diversion of the footpaths, and straightening of the stream, and that plans be prepared which could be put into operation at any future time when it might be considered desirable. Whether or not it would be found advisable, no one could at present tell; but he might say that the capacity of the existing works was 25 per cent. over the present consumption. It would, as he said, depend very much upon the extent to which the electric light was put into use; and it would also depend to a considerable extent upon the state of trade in the town. At present about one-half the production of gas was used in cycle factories, and the other half for lighting. If the cycle trade kept good or improved, and the consumption of gas was not interfered with by the electric light or by larger schemes of electrical supply now before Parliament, they might possibly want auxiliary works; and the further land it was proposed to purchase would then be ready for use. In reply to a question, Mr. Andrews stated that there was no reason to believe that the consumption of gas for lighting and cooking was diminishing; the decrease was believed to be in the use of gas for manufacturing purposes. The motion was adopted.

PROJECTED EXTENSION OF WEST BROMWICH GAS-WORKS.

At a Meeting of the West Bromwich Town Council last Wednesday—the Mayor (Mr. S. Pitt) presiding—the Gas Committee submitted a special report with regard to an important scheme which has been under consideration for some time for the extension and alteration of the gas-works. The Committee have had under consideration two reports presented by the Manager (Mr. Thomas Glover) on the matter, in which he recommended the following works to be undertaken during the ensuing summer, so as to be in readiness for the winter of 1899-1900: New and larger bench of retorts to be built on the site of a bench worn out, £3840; additional coal elevators, &c., connected with the existing charging and drawing machinery, £1660; extension of the meter-house and additional meter, together with stokers' messroom to replace one proposed to be taken down, £1500; additional purifiers, valves, and connections, £2500; new and larger boiler in place of one to be taken out, £300—total, £9800. The Local Government Board, on May 26, 1892, sanctioned the above-mentioned works, the following of which have not yet been carried out: Meter-house and meter, £1050; additional purifiers, £2500; stoking machinery (£2750, less £2104 already expended), £646—total, £4196. This leaves a balance of £5604 to be provided; but of this amount £1926, which is outlay in the nature of alterations or substitutions, will have to be charged directly to revenue account. As regards the remaining balance of £3678, the Committee hope to be able to make such arrangements as will avoid the raising of a loan. Alderman R. Farley, in moving the adoption of the report, remarked that the Committee had for some time had under consideration the desirability of making some extension of their manufacturing plant. At first the Committee hesitated to do so, and agreed that, if it were possible, they would struggle on with the present arrangements, in order that they might see how the introduction of electricity would affect the undertaking. But the consumption of gas, he was pleased to say, had augmented to a much greater extent than they anticipated; and, so far, during the present year, he estimated the increase had been quite 8 per cent. This would mean an addition of about 20 million cubic feet in the consumption of gas; and as they had already received applications to supply some very large gas-engines in the borough, and seeing that many new houses were being erected, they thought the present an opportune time to make the alterations contemplated. Besides, the Committee had received notice that 100 new gas cooking-stoves were required; and, altogether, he believed the total increase on last year's output of gas would be found to be about 37 million cubic feet. It was absolutely impossible for the present manufacturing plant to cope with this largely increased demand; and he was quite sure no one desired to see the town in darkness. Alderman Rollason seconded the motion. The Mayor remarked that the Committee were not at first of one mind on the question. But they found that they had applications or 20 millions from one

source, 13 millions from another, and 4 millions from a third; and, under these circumstances, they were forced to come to the conclusion that the suggested additions and alterations ought to be made. The report was unanimously adopted. The ordinary report of the Committee stated that the sales of gas for the Christmas quarter of 1898 were 95,865,825 cubic feet; and the amount of the gas-rental (excluding public lighting), £11,099, being a satisfactory increase over the corresponding quarter of the previous year.

There can be no doubt that for some time the works have been pretty well taxed to meet the town's supply; and with the prospective increased demand, the Committee came to the conclusion that it would be quite impossible for them to face requirements without the extension which has been decided upon. The works have been in existence for more than twenty years, and during all that time very little has been done in this direction; but, owing to the forethought of those who were concerned in the first establishment of the works, there will be no difficulty in regard to the land, for they prudently acquired sufficient to provide for enlargement. The whole of the work is to be put in hand as soon as possible; and it will be carried out under the supervision of Mr. Glover, who has been instructed by the Gas Committee to report upon the question of further developing the machinery in the retort-house, more especially with reference to mechanical appliances for removing coke to the canal boats and the coke-yard. This and other improvements about the retort-house, if carried out, are expected to effect a saving of about 5d. per ton of coal. It may be remarked that West Bromwich was about the first town to make a considerable reduction from the ordinary price of gas in favour of gas-engine users; and it will be seen from the foregoing report that this concession is being appreciated. There is no doubt that cheap gas for motive power is a great advantage to manufacturers, and indirectly to the community, not only because it encourages and fosters trade, but also because it is an important factor in getting rid of air pollution; there being no smoky boiler chimneys where gas-engines are in use. Questions have been raised as to the competition of electricity with gas for the production of motive power. But the Gas Committee need, we think, have no apprehension on this score. One who is regarded as a competent authority on this matter made the following remarks to a representative of a local paper: "Although some public companies debit themselves with 1d. per unit for electricity used for tramway purposes, 2d. per unit is regarded as a very moderate price for purposes of motive power. It takes practically one unit of electricity to represent a horse power. This would be 2d. per horse power at the motor on the consumer's premises. The Committee are offering gas at prices from 2s. 6d. down to 1s. 6d. per 1000 cubic feet, according to the quantity consumed. Worked out on the lower scale, the price of gas is about 0·3d. per horse power per hour, and on the 2s. scale it comes out at about ½d. per horse power per hour. When this difference is properly appreciated, there will be a further and greater development of the use of gas for manufacturing purposes."

THE FINANCIAL CONDITION OF THE TODMORDEN GAS UNDERTAKING.

Reduction of Price v. Relief of Rates.

At the last Meeting of the Todmorden Town Council, the Chairman of the Gas Committee (Alderman Jackson) made a statement in reference to the financial position of the gas undertaking. He did so in pursuance of a resolution passed by the Committee that he should publicly answer an allegation made to the effect that there had been a loss of more than £8000 on the gas-works in three years. After mentioning several very disadvantageous conditions under which the Local Authority took over the gas-works on March 31, 1893, the speaker said they had had only two years' gas accounts properly audited. During the five years ended in March last, besides paying interest and all other charges upon the works, they had repaid out of revenue, mortgages to the extent of £3285, and they had paid to the stock redemption fund £4368. In other words, the amount of capital they had actually paid off was £7653. They did not raise the price of gas during the coal struggle in 1893; but in March, 1895, they reduced it by 3d. per 1000 cubic feet. He was not going to say that this was the wisest thing to do; perhaps they were a little misguided at the time, or did not look sufficiently ahead. Anyhow, they took 3d. per 1000 feet off the price of gas; and this 3d., with the reduction of meter-rents, amounted to £3984 up to March last. Had they not lowered the price, they would have had practically £4000 more in hand at present than they had. This £4000 the gas-consuming ratepayers had. Removing the 3d. was about equivalent to reducing the rates 3d. in the pound. The probability was that if they had not taken this 3d. off the charge for gas, but applied the £4000 to the relief of the rates, it would have been thought a large sum; in effect, however, it was practically the same. If the Local Authority had not bought the gas-works, the probability was that the consumers would not have had the £4000 in their pockets. He was in favour of cheap gas. He mentioned these things simply because they reduced the price of gas at a time when it was rather difficult to make it pay, and when surrounding towns were advancing it. If this £3984 was added to the capital they had already paid off, they had a total of £11,638. After meeting interest and repayments as stated, the account was overdrawn by £1823. This deficiency was made up to the year 1897. In 1898 they did not increase the deficiency, but rather lessened it; for in the year ended March, 1898, they paid all the charges that came against the undertaking, and also £1100 off mortgages, and contributed to the sinking fund £907. In other words, the capital paid off in that year was £2007, and they made a profit of £36 16s. 9d. He admitted that the profit was small; but it showed that there had been a considerable improvement—an improvement over the average of the previous four years of £502, and this with a decreased sale of nearly 2 million cubic feet of gas, owing to the season being light. From this short statement, he thought the members would see that there need be no regret that the gas undertaking had been purchased. They had done considerably more than pay their way—they had paid off in capital £7653; so that the statement should have been that they had made £8000 of profit, and not £8000 of loss. This would have been much nearer the mark. As to the works at present, they were fairly well equipped; and there was no excuse at all, so far as he could see, for either bad gas or no profit in the future. The average price was 2s. 9d. per 1000 cubic feet, which was not a high figure for a district like theirs. He added, in answer to a question, that the Auditors had taken the last balance-sheet of the Gas Company, for the year 1893, and treated the accounts from that date. Some of the items which the Company had placed to capital had been transferred to revenue; and this made the Council's deficit appear greater than it otherwise would have done.

EXTENSIONS AT THE WESTHOUGHTON GAS-WORKS.

In celebration of the completion of some important additions to the works of the Westhoughton Gas Company, a social gathering was recently held, at which the Chairman of the Company (Mr. W. C. Buckley) presided. In proposing the toast of "Success to the Westhoughton Gas Company," the Chairman said that, from a small beginning, the undertaking had progressed from time to time, and its present position was a source of great satisfaction to all connected with it. By their recent extensions, they had doubled the capacity of their retort-house; and in effecting this, and making other improvements, he thought they had done wisely. The work had been well carried out; and he believed it would materially aid in helping them to carry on operations with increased satisfaction. The toast was heartily honoured. During the proceedings, the Company's Manager (Mr. J. Pickup) was complimented by the Clerk to the District Council (Mr. T. Partington) for his prompt attention to the proper repair of the roads when they had had to be taken up for main-laying purposes. A vote of thanks was tendered to Mr. Pickup, and a warm tribute was paid to him for his faithfulness, assiduity, and constant regard for the interests of the shareholders and all the workpeople connected with the undertaking. The retort-house has been made 50 feet long and 54 feet wide; and it has a height of 26 feet from the ground to the eaves. It is of brick and stone, with an iron span roof, &c. A new lime-house and cannel-store, 61 feet long and about 25 feet wide, has also been constructed; and a new boiler has been put in in connection with the sulphate of ammonia plant.

THE TAXATION OF GAS AND ELECTRICITY IN ITALY.

Those of our readers who perused the interesting speech of the Chairman of the Continental Union Gas Company (Mr. A. Lucas) at the recent half-yearly meeting, will no doubt remember the deplorable picture he presented of the financial condition of Italy. In that beautiful, but impecunious country, as we remarked in commenting upon the proceedings at the meeting, the idea seems to be, whenever there is a bit of business doing, to tax it. Gas is already taxed to the extent of about 5½d. per 1000 cubic feet; and Mr. Lucas told his fellow-shareholders that the Government were seriously considering the advisability of increasing it to 1s. 1½d. The Directors will, of course, use all possible means to resist the imposition of this taxation; and the consumers themselves should lend their aid, for they are the sufferers in the end. We learn from "L'Elettricità" that not only is it proposed to further tax coal gas, but that made from mineral oils is to bear a much heavier burden than it now does—the suggestion being to make the present 8 centesimi into 18 centesimi per cubic metre, or an advance from 1s. 9½d. to just over 4s. per 1000 cubic feet. Electricity comes off better, with a rise from 6 to 10 centesimi per kilowatt-hour of electric energy employed for lighting or general purposes, except heating, in which case the increase is only to 8 centesimi. The gas and electricity employed for municipal lighting and motive power are to be exempt from taxation, provided there are pipes and conduits for them distinct from those which are taxed. The producer has the right to charge the consumer a higher price on account of the extra tax; deductions being made for loss in conveyance and escapes. Calcium carbide comes in for some of the burden. There is to be a tax of 30 lire per quintal on its manufacture and importation; but nothing in the case of exports. Every gas, electric light, or calcium carbide works is to be licensed by the Technical Office of Finance. The annual licence fee is to be 5 lire for works or plant producing supplies exempt from taxation, for those of a temporary character, or employed to supply apparatus having an annual consumption taxable to the extent of 200 lire; 10 lire for a consumption taxable to the extent of 200 to 1000 lire; and 20, 40, and 60 lire according as the tax applicable ranges from 1000 to 4000 and 8000 lire and upwards. While on the subject of Italian finance in connection with gas, we may mention that, according to the "Financial News," the shares of the Anglo-Romano Gas Company show a marked loss, due to the reduction in profits that will accrue under the new convention with the Municipality of Rome, to which reference has been already made in the "Journal." At the extraordinary meeting of the Company on Dec. 28, an eventual issue of bonds bearing 4½ per cent. interest, and redeemable from 1911 to 1929, was approved for an amount up to 5,000,000 lire. Moreover, the Board were granted power to acquire an interest in the existing Acetylene Gas Company to the extent of 2,000,000 lire.

A conference of Italian manufacturers and electricians lately took place in Rome to consider the proposed increase of taxation; and the following observations thereon were unanimously agreed to, and forwarded to the Ministry of Finance: (1) That industry in general requires for its development greater continuity in the system of taxation, and that the electric industry in particular cannot be consolidated without permanent and peaceful conditions which have not hitherto existed. (2) That the comparison made in the scheme in question between the tax on petroleum and that on electricity has no solid basis, because petroleum is only an object of commerce, whereas electric lighting is a product of local industry, in most cases utilizing water power, and causing a simultaneous development of the mechanical and building industries, to the benefit of general economy and of the Treasury. (3) That in many small districts, where there is a slight amount of water power which can be easily utilized for illumination only, electric lighting, if there were no tax on it, might become the light of the poor. (4) That the tax on electric power, already burdensome, is greatly increased, and converted into a tax on production instead of consumption, and prejudices consumers against the companies; making

it impossible for the latter, especially when contractors, to deal equitably, and sometimes to reimburse themselves for the tax paid. (5) That exemption of taxation for municipal lighting and motive power, including electric traction, on condition of employing separate plant, would too frequently cause taxation of the municipality for lighting, and particularly motive power, contrary to the spirit of the law, because it is frequently too expensive and technically complicated to construct separate installations; the more so as the uncertainty of our system of taxation does not assure to industry that, after subjecting itself to expenses, its sacrifice will not be nullified by successive modifications in the law extending the tax even to those cases in which it now proposes separate installations, as stated in the project. (6) That the tax on electric power employed exclusively for heating is not only onerous but prohibitive, because it is based on inaccurate data and calculations. (7) That the project does not deal with the needs of accumulator factories and the electro-chemical industry; so that the tax is just as burdensome as in the case of electric lighting, and thus prevents progress in these industries. (8) That the tax of 30 lire per quintal on manufactured calcium carbide, notwithstanding an equal tax on imports added to the cost of manufacture, would completely paralyze the development of this industry in Italy; and in every case taxation should be more equalized. (9) That in some special industries, such as the manufacture of incandescent lamps, the various carburetted gases and electric power are indispensable to manufacture the product; so that in consequence of the tax, Italian makers would be unable to compete with foreign articles which are practically free from duty. (10) Considering that the project is worded in such a way that its simple financial application would burden industry in general with exorbitant and prohibitive taxes perhaps not intended, the Assembly expresses the wish that the scheme in question will not become law.

With respect to the proposed tax on calcium carbide, "Luce e Calore," quoting from the journal "Il Commercio," remarks that, admitting that acetylene gas is practically a competitor of petroleum, coal gas, and electric light, any tax imposed on calcium carbide should be proportionate to the taxes on other illuminants; and this is not so in the existing project. Coal gas, for example, is to be taxed with 5 centesimi per cubic metre. Thus acetylene gas which, in theory, has a lighting power ten times that of coal gas, should pay a tax of 50 centesimi per cubic metre. Supposing that a kilogramme of good carbide yields theoretically 300 litres of gas, a tax of 30 lire per quintal would be equivalent to 1 lire per cubic metre of gas, which is just double. If the 10 francs paid as duty are added, the total tax amounts to 1·33 lire per cubic metre instead of 50 centesimi as for coal gas. It is pointed out that coal gas is employed for motive power and industrial purposes; and in such cases it is exempt from taxation. A tax on calcium carbide, however, is a tax on all acetylene gas, for whatever purpose it may be employed. There appears to be a future for acetylene in Italy, judging by the plant for the manufacture and distribution of this gas which was exhibited at the Turin General Exhibition. With the proposed tax, acetylene would cease to be employed, inasmuch as it is at present adopted only because the cost of carbide on the frontier is about 35 frs. per quintal. If this price were made about double through tax and duty, no one would use acetylene; and while other countries availed themselves of this gas, Italy, which, according to the above-named authority, has the best acetylene plant in Europe, would remain far behind, after having taught others. There are three carbide factories in Italy—one at Narni and Foligno, another at Colestatte, and the third at St. Marcel.

ELECTRIC LIGHTING NOTES.

The Electric Lighting Committee of the Cardiff Corporation have accepted a tender, amounting to £4084, for extensions at the generating station.

It was reported at the meeting of the members of the Liverpool Electric Power and Lighting Committee last Friday that the Local Government Board had given their sanction for a further loan of £44,000 to be obtained for electric lighting purposes in the city.

The Rotherham Town Council last Wednesday sanctioned an application to the Local Government Board for their permission to borrow £25,000 for electric lighting purposes. The scheme is not a large one; but it will comprise all the business premises and such properties as are likely to take current. Professor Kennedy has reported favourably on the prospects of the undertaking.

The supply of electricity in Canterbury is now an accomplished fact, although the Corporation works are not to be formally opened until about the third week in this month. In the meantime, in order to see that the plant is in proper condition, it is intended to supply those citizens who have their premises properly wired with current for the space of fourteen days free of charge, instead of wasting the energy. Of course, the Corporation during that period will accept no responsibility if anything goes wrong.

Though the Newington Vestry have not finished laying the cable for their electric lighting, a foretaste of the attitude of the majority was given at Wednesday's meeting, when the Vestry Clerk, replying to a question of financial detail, said that it was unwise to discuss the matter in the presence of the Press, as the Vestry had to compete against a private company. Mr. Davis protested that the minority were refused representation on the Committee, and wanted a reply in open Vestry; but he was cried down, and the matter dropped.

The Tunbridge Wells policemen are no longer to be considered lamplighters. It appears that for two years those members of the force who were on night duty have assisted the Electric Lighting Committee by switching on the arc lamps during the night patrol; but at last Wednesday's sitting of the Town Council, it was agreed that other duties of the men, who now patrol 70 miles of streets, make the extra task very inconvenient. One of the councillors mentioned that this change would mean an extra expense of £250 a year.

The municipal authorities at Cape Town have under consideration proposals for extending the electric lighting plant at a cost of £20,000. The suggestion has been made that hydraulic power should be further utilized; and Mr. T. Stewart, the Engineer of the municipal water-works, has prepared a scheme by which the fall of water from the reservoir on Table Mountain might be utilized to generate all the electric energy required for years to come. The cost is, however, estimated at £70,000; and it is probable that a less costly scheme will be adopted.

At the meeting of the Hampstead Vestry last Thursday, a proposal was made that a portion of the parish around Parliament Hill should be lighted by arc lamps; but the Vestry decided that, "as they had only very recently ordered an increase in the illuminating power of the gas-lamps in the locality, further consideration be adjourned for three months." The Chief Electrical Engineer's salary was raised from £450 to £550; but Mr. Watson suggested, amid laughter, that this increase should be conditional on the arc lamps on Haverstock Hill behaving properly.

Middlesbrough seems now in a fair way of seeing the commencement of the construction of the long-contemplated electric lighting works. The question of the site has been the source of much delay; but now the Committee have accepted a recommendation of a Sub-Committee to set the works up on the gas-works land. The position is a good central one for the purpose; but there are certain members of the Council who urge that to take up valuable land near the gas-works might prove prejudicial to their extension when growing Middlesbrough demands it. In reply to this objection, it is pointed out that all possible extension of Middlesbrough is at some distance from the present gas-works, and that it would doubtless prove more economical to lay down additional gas plant further south, nearer the centre of the latest additions to an already extensive town.

An agitation is in progress just now in connection with the electric lighting of Acton. The old Local Board obtained a Provisional Order in 1891, and sold it to a private firm. In consequence of certain action taken by the ratepayers, the Board of Trade declined to confirm the sale and transfer the Order. The District Council was formed in 1894; and Mr. Corrie Grant and a few Progressives were elected. Eventually the sale was abandoned, and, on the suggestion of Mr. Grant, a postcard vote was taken. By a majority of three to one, the ratepayers decided in favour of having their own electric lighting works. Now the monopoly of supplying electricity has been given to the Metropolitan Electric Supply Company, Limited, for seven or ten years, at 3d. per Board of Trade unit. It appears that this decision was come to at a meeting called for another purpose, when Mr. Grant and two other prominent Progressives were absent. A crowded meeting has been held at the Liberal Club, influential deputations have waited on the Council, and a requisition is now being numerously signed asking the Chairman to call a town's meeting on the subject.

A complaint was made by Alderman J. Thomas at the meeting of the Crewe Town Council last Wednesday that the Electric Lighting Committee were rushing through a partial scheme for lighting the town without giving adequate information to the Council. They were proposing to borrow £32,000 for the scheme; but, according to report, they only intended to light 4 miles out of the 32½ miles of streets within the borough. This would still leave them with a gas bill of £1500 a year. He should like to know if there had been any canvass of the town to ascertain the number of shops likely to require the light, and whether there was a possibility of any return to the Corporation for their expenditure. He was afraid it would mean an increase of 2d. or 3d. in the pound on the rates. Alderman Latham said he had understood that for an expenditure of £26,000 they were going to light the whole of the streets in the borough. The ex-Mayor remarked that he should be agreeably disappointed if, in the first few years, there was not a deficit, but afterwards he believed the scheme would pay its way, and be a source of profit to the town. Mr. J. Wallard stated that at present the Council had to pay £2000 a year to the London and North-Western Railway Company for the lighting of the streets. He believed the electric light would cost them nearly £3000 a year, and leave them still with a gas bill of £1500 a year for the remainder of their streets. Mr. A. G. Hill, Chairman of the Electric Lighting Committee, in reply, said there had been no special canvass to ascertain the number of shopkeepers likely to become consumers; but from the experience of other towns, similarly situated, it was believed, that after the first year or two, the scheme would pay. The £26,000 would lay down all the plant they would need for many years to come. The gas supply was very bad, and was causing people to ask for the new light. The minutes of the Committee were agreed to.

Damage to Street Lamps at Wigan.—Complaint was made at last Wednesday's meeting of the Wigan County Borough Council regarding the enormous amount of wanton damage done to street-lamps. During the last twelve months 1400 panes of glass in street-lamps had been broken, causing damage to the extent of £75, and certainly 75 per cent. of which was wilful.

The Dover Corporation and the Gas and Electricity Works.—The Dover Town Council have referred to a Committee the question of purchasing the works of the Dover Gas and Electricity Companies; and the Town Clerk has been instructed to ascertain from the Companies "an idea as to the amount required for the undertakings," and to write to Birmingham with the view of learning the result of the municipalization of the gas-works there.

Sunday Labour at the Belfast Gas-Works.—The Gas Committee reported to the Belfast Corporation last Wednesday that a deputation, representing the stokers and general labourers employed at the gas-works, had asked the Committee that all men engaged in Sunday labour should be allowed time-and-a-half when so employed, and that their working hours should be reduced to fifty-four per week. They also suggested that the holiday system should be abolished, as it worked unfairly. It was mentioned that the matter had been referred to a Sub-Committee, who had not yet reported.

Gas Supply at Grahamstown.—From a communication just received from Mr. W. Arnott, the Manager of the South African Lighting Association, Limited, we learn that there is hardly a flat-flame burner to be seen anywhere in Grahamstown; the incandescent gas-burner being installed both in shops and houses. The Association do the whole of the fitting from the main to the burner, and hence there is great freedom from complaints, and a good general lighting effect all over the town. Gas-stoves are not much used, owing to the low price of wood as fuel; and gas is 12s. 1d. per 1000 cubic feet—coal costing £3 5s. and upwards per ton delivered on the works. The make of gas, however, is increasing very rapidly.

METROPOLITAN WATER SUPPLY COMMISSION.

Forty-Seventh Day—Monday, Jan. 30.

(*Viscount* LLANDAFF, *Chairman*, *Sir* JOHN E. DORINGTON, Bart., M.P., *Sir* G. B. BRUCE, M.Inst.C.E., *Major-General* A. DE COURCY SCOTT, R.E., *Right Hon.* J. W. MELLOR, Q.C., M.P., *Mr.* A. DE BOCK PORTER, C.B., *Mr.* H. W. CRIPPS, Q.C., and *Mr.* R. LEWIS.)

The Commission sat at the Guildhall, Westminster.

The following are the Counsel engaged: Mr. POPE, Q.C., and Mr. CLAUDE BAGGALLAY, Q.C., for the New River and the Southwark and Vauxhall Water Companies; Mr. LITTLER, Q.C., and Mr. LEWIS COWARD for the Kent Water Company; Mr. PEMBER, Q.C., for the Lambeth, East London, Grand Junction, and West Middlesex Water Companies; Mr. RICKARDS for the Chelsea Water Company; Lord R. CECIL for the Hertfordshire County Council; Sir JOSEPH LEESE, Q.C., M.P., for the Kent County Council and Kent Local Authorities; Mr. BALFOUR BROWNE, Q.C., and Mr. FREEMAN, Q.C., for the London County Council; Sir R. NICHOLSON for the Middlesex County Council; and Mr. GABRIEL P. GOLDNEY (Remembrancer) for the Corporation of the City of London.

Mr. BALFOUR BROWNE said he understood, from the evidence given by Mr. Groves the previous week, that this gentleman was appearing in some sense for the Thames Conservancy.

Mr. POPE: Oh, no.

Mr. BALFOUR BROWNE remarked that Mr. Groves misled him at the time. He thought he was giving evidence on behalf, and with the sanction, of the Thames Conservancy Board, but that was not so.

Sir *Alexander Binnie* was then recalled and examined by the CHAIRMAN with reference to the drought of last year. The total flow of the Lea was determined by the quantity taken for the supply of the New River and East London Companies, and the quantity allowed to pass down for the purposes of navigation, and the total capacity of the storage. He handed in a diagram of the actual flow of the Lea from August, 1897, to the end of 1898. The diagram showed that in 1898 the flow of the river, after the New River Company had taken their 22½ million gallons, was not sufficient on some days during the drought to give 5½ million gallons for navigation. It was pumped up. He could not say what quantity on the average was left for the East London Company, after the New River Company had their first draft, and after navigation had been satisfied. The East London Company had reservoirs at the present time of 1210 million gallons total capacity; and under their Act of 1897, they had power to construct further storage for 1015 million gallons. He had assumed in his diagrams that all these reservoirs were available and full, at the beginning of August, 1897. From this quantity he had deducted, not 30 million gallons a day for the supply of the East London Company, but the average quantity they took from the Lea in the six years 1892 to 1897, which amounted to 32,500,000 gallons daily. To this he added 5,400,000 gallons required for navigation, which gave 37,900,000 gallons a day. There would have been a deficiency of storage to make up of 5,308,000,000 gallons on Dec. 6, and of 5,220,900,000 gallons on Dec. 31. In the diagrams he had made no deductions for flood water not taken, because there were only three cases worth mentioning in the 17 months—in January, March, and December, 1898. The reservoirs would have been empty on May 30 last. From this diagram he concluded that, looking to the future, and taking into account the inevitable increase of population in the East London Company's area, the Lea Valley, for all practical purposes, was exhausted; and to construct in it further reservoirs of larger capacity—beyond those already authorized—would only lead to a wasteful expenditure of money. The Company had got so near the end of the possible supply from the Lea, in such a year as 1898, that they had better go to another source; and in any dry season for many years to come, the Company would have to be assisted from the Thames. If the population increased, the deficiency would be aggravated.

The CHAIRMAN: You think that it is not worth while to attempt to make the supplies from the Lea come up to the requisite amount by storage?

Witness: I think it is an extravagant way of doing it.

That must depend on whether there are other less extravagant ways?—Yes. If a similar season to last year should recur, and if there were a complete system of intercommunication, the needs of the East London Company could be supplied by aid from the other Companies, which would be less expensive than making further enormous reservoirs.

Witness next handed in three tables with regard to the Thames, similar to the ones already handed in, and some diagrams showing how his estimates would be altered by the events of 1898. One diagram showed the effect of supplying 185 million gallons a day, maintaining a minimum flow at Teddington Weir of 200 million gallons daily, and excluding floods for fifteen days. The reservoirs would have remained full from the end of January till early in July. The flow would have been reduced to 200 million gallons a day for 135 days, extending from about July 2, with one or two exceptions, till Nov. 22 or 23. During this period, the average natural flow of the river was 259·2 million gallons; and the average flow of the river from the beginning of the year, including the floods of January up to Nov. 30, only amounted to 679 million gallons—about half the average of former years. The lowest point to which the reservoirs would fall would be on Oct. 17, when they would have contained 30·3 million gallons. The natural flow at that time would be about 300 million gallons. In this calculation, he took the gross capacity of the reservoirs as 18,000 million gallons, from which he deducted 2000 million gallons for cleansing and 2000 million gallons more for bottom water and evaporation—leaving a net capacity of 14,000 million gallons. Another diagram related to the working of the Staines scheme under the conditions of 1898, when 300 million gallons were being drawn, and with a minimum flow of 200 million gallons at Teddington Weir. The diagram showed that the reservoirs would be full till June 15, and empty on Oct. 17 and Nov. 28. The river would be drawn upon for supply or to fill the reservoirs for 337 days; and there would be 174 days during which the flow would be reduced to 200 million gallons, as compared with a natural flow during that period of 316½ million gallons a day. When the reservoirs were empty, there would not have been a failure in supply, because there was water available on those days in the river. This calculation assumed a net storage of 28,500 million gallons, against 27,699 million gallons as estimated by Mr. Middleton. The difference between witness and Mr. Middleton was chiefly as to the gross storage. Another diagram related to a supply of 400 million gallons from the Thames, with a minimum flow at Teddington Weir of 200 million gallons, under the conditions of 1898. The gross capacity of the reservoirs would be 55,600 million gallons, and the net 46,000 million gallons. On this basis, all would go well till Nov. 29. However big they made the reservoirs, they would remain full during the months when they were not wanted, and become rapidly depleted in the months when they were. The difficulty was not in connection with the average annual rainfall, but with the possibility of dry months between May and November. This last diagram showed that the river would be reduced to 200 million gallons a day for 206 days.

By Major-General SCOTT: As the water impounded had to be lifted, a considerable portion of a flood must always escape, unless they erected inordinately large pumps to catch it.

The CHAIRMAN: Is there any site on the Thames which would take water that you can draw in by gravitation?

Witness: I think not.

In further examination, witness said there was not the slightest doubt that the Yrfon reservoir would carry them over three consecutive dry years. The Yrfon calculations were on the rainfall of three consecutive dry years, not on the flow of the stream. The Yrfon reservoir would hold 39,000 million gallons, of which 35,700 million gallons could be drawn off. In his estimates as to the extra expense resulting from the altered conditions, he took the cost of constructing reservoirs in the Thames Valley at £320 per million gallons. The cost of pumping was taken from Messrs. Hunter and Fraser's estimates, as given before the Balfour Commission, and capitalized at 30 years. In the result, witness brought out the additional cost of obtaining 185½ million gallons at £8,115,665, 300 million gallons at £17,561,580, and 400 million gallons at £27,063,773. In each case he added £2,299,160 in respect of authorized works not yet completed or brought into capital account.

The CHAIRMAN: I suppose in your view the cost of obtaining the supply of 185½ million gallons a day would be a figure to come off the estimated value of the undertakings?

Witness: That is so.

Whereas the larger sums necessary to supply 300 or 500 million gallons would be the cost that the purchaser would have to incur?—Yes, if he went on with the Staines scheme.

Examination continued: He could not contemplate the effect of taking the whole flow of the river; this, and the taking of all the floods, would be disastrous. The only way of keeping open a tideway was not by the reflux of the tide, but by the down-flow of the upland water. Questioned as to whether the effect of the flow of 200 million gallons as compared with 100 million gallons daily would not be inappreciable, witness said the flow of 100 million gallons was powerless for scouring purposes, while the flow of another similar quantity would be effective.

Cross-examined by Mr. PEMBER: As to the Lea, in his opinion the difference between 1893 and 1898 was such that to make the storage efficient it should be increased from 2200 million gallons to meet the conditions of 1893, to more than 7000 million gallons to meet the requirements of 1898. He thought there was no difference between him and Mr. Bryan on this point, because in the East London Water Bill now before Parliament power was sought to construct another 5000 million gallons storage.

Mr. *C. J. More*, Engineer to the Thames Conservancy, examined by the CHAIRMAN, said the Conservators, when the Balfour Commission were sitting, considered what would be the safe minimum flow of the Thames; and on Dec. 5, 1892, they passed the following resolution: "That the Engineer be authorized to state, in evidence before the Royal Commission on the Water Supply of the Metropolis, that it is the opinion of this Board that when, after the abstraction of the quantity of 130 million gallons a day now allowed to be taken for the supply of the Metropolis, the day's discharge at Teddington Weir exceeds 200 millions of gallons, there may be further taken such part of the excess as may be required for immediate consumption or for storage; but that in no case should the discharge over the weir be allowed to fall below 200 million gallons unless compensation is made by a tidal reservoir, or otherwise, to prevent injury to the river below the site of the new lock and weir at Richmond." On Jan. 23 last, the Board again considered the matter, and passed a resolution that they saw no reason to depart from the one of 1892, and that they adhered thereto. The water flowing over Teddington Weir was gauged every day; but the weir was not well adapted for accurate measurement, as it involved the use of a number of gauges each of which had to be calculated separately. It was also slightly leaky. He attached importance to the flow of 200 million gallons daily. If it were reduced to 100 million gallons, it would probably stop a large amount of navigation. Below Richmond, the level water would by the suggested reduction of the flow be reduced at dead low water by about 7 inches; and this would apply to a very narrow channel. Low water lasted three or four hours; and the difference of 7 inches would stop launches and pleasure steamers to a large extent. In the middle channel at low water, the maximum depth was only 2 ft. 6 in. Immediately below Richmond Lock, there was considerable depth; but this extended only a short distance. The floods were of very great importance in scouring the river. The flow of 200 million gallons at Teddington was sufficient to keep the river clear; but if it were reduced for a long period, mud would begin to accumulate. Last summer the Conservancy had no complaints as to steamers grounding; but the previous year there were many. In September last, the flow on every day but four was below 100 million gallons. He heard of a number of steamers grounding—some for hours at a time. September and October last were the worst months in his experience.

By Mr. DE BOCK PORTER: He could not say whether the 1892 resolution was passed unanimously. The one of 1899 was agreed to by 22 votes to 4. No one on the Board on the latter occasion advocated more than 200 million gallons. If the Conservators were guaranteed this quantity at Teddington Weir, any surplus might go to the Water Companies.

By the CHAIRMAN: If the quantities drawn by the Companies in August and September last had remained in the river, the flow would have been above 200 million gallons every day. The principal source of the Conservators' income was the payments of the Companies; but this did not make it awkward when they were negotiating with them. The operations of the Conservancy Board had been very successful in checking pollution. He thought the sewage works of the river towns were efficient, if constantly watched. If the flow were reduced as suggested, the water between (say) Richmond and Molesey would move much more slowly. With sewage effluent flowing in as at present, there would be greater chance of pollution.

By Mr. BALFOUR BROWNE: Sewage effluent put into stagnant or semi-stagnant water was apt to become offensive to persons living near, whether it was drunk or not. Secondary decomposition took place in an effluent when put in still water. He did not understand the 200 million flow to mean that the Companies, when the natural flow was below that quantity, were to make it up. If the down-flow were diminished, there would be a tendency to silt up below Richmond Weir. He knew of no tidal creek that was kept open by tidal water alone.

By Mr. PEMBER: To adapt Teddington Weir to requirements would cost about £5000. As to taking another 100 million gallons from the river and compensating by means of a tidal reservoir, witness said that when before the Balfour Commission he considered the construction of such a reservoir at Richmond of 100 million gallons capacity, which could have been filled and let out every other tide, and would have cost £200,000 or £300,000. In his opinion, the Richmoud Lock had no flushing power whatever. As at present constituted and empowered, he had no doubt the Conservancy Board could make the purification of the river keep pace with the increase of population.

Lieut.-Col. *Lockwood*, M.P., examined by the CHAIRMAN, said he was Chairman of the East London Water-Works Company. They had a Committee who met every Friday at St. Helen's Place to deal with complaints regarding the supply. The cost of management totalled £24,650. Over 90 per cent. of the houses supplied had constant service. The Company failed in their supply last summer; and, given another year like 1898, the water available would be insufficient for a constant supply to all their customers, unless aid were obtained from other Companies. He attributed the failure of last year largely to the absence of cisterns; but he did not share the views of the Local Authorities that cisterns were a nuisance, and ought to be suppressed.

The CHAIRMAN: We have been told that in the class of houses that exist in your district, it is practically impossible to have the cisterns clean and wholesome.

Witness: I do not see why, because the Company find the local Officers of Health are active gentlemen; and I do not know why they should not inspect the cisterns as they do the drains.

Examination continued: The East London Company would be unwilling sellers of their undertaking, and if forced to sell would have to part with what they believed was a growing and improving concern. The purchase should be under the Lands Clauses Act, because that was the recognized law for this sort of purchase, and it provided for the value of the land to the owner—not necessarily its market value, or the value to the purchaser. The Act also provided recognized and well-considered machinery for assessing the value, all its provisions having been tested before the judges; and, further, wherever a corporation had compelled a company to sell, the purchase was always under this Act. Questioned as to whether purchase would be financially expedient for the water consumers or the ratepayers, witness said it would depend on who bought. If the body were capable, it would simply be a matter of management. It was practically assured that, if the London County Council were the purchasers, the consumers would not benefit, because from their political constitution and liability to change, he did not believe the Council would act properly. Further reasons were that the Council had used misleading arguments in favour of purchase in the past, and that he thought their management would be bad. Given good management, there might be financial advantage to the consumers in having the water supply managed by a body whose object was, not to profit shareholders, but to secure the best possible state of things for their constituents. Regarding the method of purchase, he thought the very rough scheme of Mr. Banbury was rather taking at first sight. He agreed that if the arbitration, both as to the present income and possible future profits, were fair, there should be profit on neither side.

Mr. PEMBER remarked that there ought to be no profit and no loss.

The CHAIRMAN said if the purchaser were a public authority they would have to provide a sinking fund; and then, if they were philanthropic, they should cut down the rates to a somewhat lower figure.

In further examination, witness said he thought the Company should be given 10 per cent. for compulsory sale. If the purchase were under the Lands Clauses Act, it would be in the power of the arbitrator to take this into consideration or not. Witness would be content to leave it in that way. Provided the arbitrator considered the prospective value, he agreed, after some discussion, that the compensation for compulsory sale should be in respect of the cost and delay of finding an equally good investment. He thought the drought of last summer was, in some cases, aggravated by wilful waste, in order to increase the difficulties of the Company.

Forty-Eighth Day—Tuesday, Jan. 31.

All the Commissioners were present except Mr. Cripps.

Lieut.-Col. *Lockwood*, who was examined on the previous day, now attended for further examination.

Mr. BALFOUR BROWNE: With regard to the last famine, are you not aware that it might have been foreseen from past experience?

Witness: I will be perfectly honest with you. At one time I did puzzle my head very much as to whether it might not have been foreseen. I questioned Mr. Crookenden and Mr. Bryan, and I have taken a great deal of personal trouble; and I am of opinion it could not.

You are aware that, as long ago as 1864, your then Engineer said you were at the end of your resources?—No, I did not know that.

You know you had a very severe test in 1893; and then there was a failure of supply. Last year you purchased water from other Companies. That is so much the worse for your Company, and so much the better for them?—Yes. The Company are taking steps to obviate such a famine in the future; and this will involve expenditure of money.

Suppose you expend merely sufficient money to enable you to do your duty in the future, that will not be remunerative outlay?—I think I am not mistaken in saying expenditure has always been remunerative.

Up to the present time you are bound to supply half a million of people; and you do not do it efficiently. Suppose you put down works merely to supply this half a million of people; you will not get any more remuneration than you do at present?—No; but the works we contemplate are for an increased population.

So far as the works are for an increased population there will be increased remuneration; but so far as they are to enable you to do your duty to the present population, they will not?—Well, we do the works together.

In further cross-examination, witness said that, on the subject of control, he should be willing to make it obligatory on the Water Companies to admit the Water Examiner and Analyst to their works. He should not like to be put under the authority of anyone who would have power (say) to direct the Company to go to Wales for water. If they must be put under authority, it should be under that of a Government man. He could hardly imagine any Conservative Chief of the Local Government Board saying a Company had failed in their duty, and ought to go to Wales for a fresh supply, at a cost of millions, whether the expenditure would be remunerative or not. His Company would be an unwilling seller in any circumstances. The scheme of Mr. Banbury, to which he had referred, was to give the shareholders in the Companies in exchange for their shares a water stock secured on the water-rates which would give precisely the same income, and upon the same security, as before. The stock also was to be a trustee stock. He agreed that this scheme might enhance the value of some Companies' stock—that of the Southwark and Vauxhall Company, for instance. If further works were carried out by the Company to meet the growth of the district, the Company would benefit by the profit; whereas if the works were undertaken by (say) the County Council, the profit would go for the benefit of the public.

By Mr. PEMBER: The total quantity of water which the Company could get, when they had proper machinery, was 54 million gallons daily, and the present supply was about 42 million gallons; so that there was an apparent surplus of 12 million gallons. Previous to 1864, the Company had, he believed, practically no storage; so that whatever straits they were in then, were due to this cause.

By the CHAIRMAN: He could not charge his memory as to why the Company did not join in the Staines Reservoirs' scheme.

By Sir J. DORINGTON: The Company were driving adits and extending their wells in Essex, and they seemed to be striking new fissures in the chalk every day; so that the prospect of obtaining greater quantities of water was increasing.

Mr. *W. B. Bryan*, Chief Engineer to the East London Water Company, examined by the CHAIRMAN, handed in tables showing the works, sources of supply, &c., of the Company, also the distribution of capital expenditure to Midsummer, 1897. The flow of the Lea was divided among the New River Company, the East London Company and the Lea Conservancy. The Companies each took 22·5 million gallons a day, and the Conservancy 5·4 million gallons a day. Any surplus was divisible *pari passu* between the Companies. The Lea Trust had the right to take the whole of the water at Tottenham Mill, four miles below the intakes. It was not the case that the East London Company put pressure on the Conservancy not to take their minimum. The fact was contradicted at the time; and the Chairman of the Conservancy Board some time after, before a Parliamentary Committee, stated that there was no foundation for the allegation. The Lea Conservancy were quite independent of the New River and East London Companies. The Board consisted of thirteen members, only four of whom represented the two Water Companies. With regard to the suggestion that the Company pumped polluted water from the lower to the upper reaches of the Lea, witness said the Company pumped water from the old tidal channel into the navigation channel at Bromley Lock, and occasionally at Old Ford Lock, which was a little higher up the navigation channel, into the ponds above. Above Tottenham Lock, also, they had pumped into the navigation channel; but not above Stonebridge Lock. They pumped no brackish water which could possibly enter the pond from which they took their supplies at Enfield Mill. Witness went on to refer to some tables put in by Sir A. Binnie giving the quantities the Company were pumping from their wells. Witness pointed out that these tables were misleading because, while what they stated was accurate, they might lead people to believe the quantities mentioned were the total yield, whereas the amount available was much greater. The reason Sir A. Binnie's figures were so small was that certain wells were under construction at the time to which his figures related. The Company had already more than 13 million gallons available, as soon as sufficient pumping power was procured and working. This 13 million gallons, however, would not be the maximum yield; they would certainly get 20 million gallons a day from the wells. The machinery at present being erected would more than enable the Company to get the 11 million gallons, even allowing for stoppages to re-pack the buckets, &c. He thought it was fair to take the present yield of the wells at 14 million gallons, because two of the wells were unfinished owing to the men who had been at work extending the headings having been drowned out. As showing the enormous yield of the wells, witness stated that last July, after pumping a Walthamstow well for 61 days, and drawing 2 or 3 million gallons a day, they stopped one Saturday night for repairs. By the following morning, the water had risen 108 feet. When the reservoirs were full, the Company ceased pumping from the wells, so as to let them recover themselves if they were exhausted; but after the very heavy pumping of last year, it was found, in December last, that there was no diminution in the yield. As soon as possible after the drought men were employed extending the tunnels and the headings, with the result that in a very short time so great was the flow that at two wells the men were drowned out. His habit was to go to his Board, as the water increased, to obtain more money for pumping machinery. The authorized and constructed storage of the Company was 2215 million gallons; and they were now seeking power to construct 5000 million gallons more at a cost of £1,000,000. This amount was approximate to the deficiency which Sir A. Binnie showed would exist in a state of drought. Sir A. Binnie provided for a daily quantity at 37·4 million gallons; witness provided for

2 million gallons less. Sir A. Binnie, however, neglected to take into account the considerable body of water flowing into the Lea below Feilde's Weir, in connection with the amount to be allowed for the navigation of the river; and his estimates therefore should be modified to this extent—the 5·4 million gallons should be reduced by that quantity.

By Major-General SCOTT: The full 7000 million gallons storage of the Company would not be needed every year. In ordinary years, with their existing population, the present storage would suffice. It was impossible to say how often the 7000 million gallons would be required for use.

Mr. PEMBER: Why should it be more wasteful to store for the conditions of 1898 on the Lea than on the Thames?

The CHAIRMAN: I suppose Sir A. Binnie's argument would be this: If you spend money in going to Wales, you have got a supply which is always available and useful; if you spend money on storage reservoirs, it is an expenditure which is called into active use only in rare and exceptional years.

Mr. PEMBER said it became a matter of money. If the Companies could do it for £10,000,000 or £15,000,000, and the County Council could not do it under £57,000,000, which was the better? Then it became a question whether the Welsh water was so much better as to justify the difference.

Major-General SCOTT: I suppose the argument would be that it would be more economical to store in the Thames Valley than in the Lea Valley?

Witness: I suppose that was what Sir A. Binnie meant.

In reply to the CHAIRMAN, witness said the proportion of the flow drawn from the Lea by the Companies was much greater than the proportion taken from the Thames.

Major-General SCOTT: And therefore storage on the Thames is more economical than on the Lea?

Witness: Yes.

The CHAIRMAN: The argument put against you, I understand, is that to spend large sums of money on storage which is only wanted, and only comes into beneficial use, now and then, in a remote and uncertain interval is a wasteful way of laying out money, compared with an expenditure which furnishes a perennial and constant supply, so that every shilling you spend is usefully and actively bringing water?

Witness: That is so; but, on the other hand, we should have to spend many hundreds of thousands of pounds to bring in the water.

Mr. PEMBER said he understood witness to mean that if the 5000 million gallons storage were made on the Thames and not on the Lea, by the time the water had been brought across London from the reservoir to the East London Company's district, as much money as if the storage were made in the Lea Valley would have been spent.

Witness said that was so.

In further examination by the CHAIRMAN, witness said that during last autumn there was a great deal of waste in the Company's district. He had had an immense number of letters from consumers calling attention to waste in different places, and asking the Company to stop it. No doubt a great deal of the waste was due to people leaving their taps open to make sure that when the intermittent supply came on they might fill their storage vessels; but he had received letters stating that it was being done to spite the Company. At present, however, the district, as regarded waste and fittings, was as good as that of any other Company. A large number of inspectors had been appointed who inspected the fittings from time to time. The district was cut up into sections governed by a meter, which gave particulars of the flow night and day. The pipes were stethoscoped and examined, and any waste was quickly detected. This system, however, could not be applied when the supply was intermittent, as during the drought of last year. It would be a great advantage to the consumers, as well as to the Company, if the latter had the right to test and stamp the fittings. The charges of the Company were apparently higher than those of any other Company, and averaged about 22s. per house. He thought the Company supplied about 80,000 houses at a loss, out of a total number 197,965. The houses in the country districts would probably be supplied at a small profit. The tendency was to get two families into one house for one water-rate. In some cases in East London, he was told there were three or four families in one house. The average number of persons per house in town was 10, and in the country 6. The charges of the Company per 1000 gallons were lower than those of all the other London Companies excepting the Southwark and Vauxhall; and their income per 1000 gallons in 1897 was slightly higher than that of the Southwark and Vauxhall Company. As a rule, the income of provincial companies was much higher than that of the East London—in many cases 2d. or 2½d. per 1000 gallons more. It would be difficult to secure a uniform rate of charge over London. Theoretically, they may get it, but never really. Of the 197,965 supplies of the Company, only 700 exceeded £150 per annum rateable value. The charge of the East London Company was about 5d. per 1000 gallons, that of the Grand Junction 7d., and that of the only provincial instance he could recollect (Nottingham) 7d. Municipal management of water concerns was, as a rule, a little more expensive than that of companies. The officials had less power; more was relegated to the water committee; and there was a little more red tape, necessitating a little larger staff than would be the case with a trading company. If all the undertakings were in the hands of one authority, there might be saving on capital account in executing work. His Company, for instance, might have to go to the Thames for more water, which would necessitate a conduit 25 miles long across the South of London, the cost of which would be enormous. If the Companies near to the source of supply were to pass it on to the East London mains, the cost would be less. He could not explain at the moment why his Company did not join the Staines Reservoirs' scheme. The scheme would have been of great advantage to them; but the difficulties of getting from Staines to East London, with an independent main on the north side of the Thames, were enormous. It seemed to him impracticable to split up their sources of supply and means of distribution between the Metropolitan Counties. It would certainly cost a large sum. As to the future, he assumed that in the beginning of 1937 the population to be supplied would be 2,472,100—a figure he arrived at by increasing the estimated population of 1896 at the rate of 18·2 per cent. decennially. This population, at 35 gallons a head daily, would require 86,523,000 gallons a day. To meet this, he proposed to obtain daily 30 million gallons from the Lea and storage reservoirs, 10 million gallons from the Thames under present powers, 20 million gallons from wells existing and to be constructed, 2 million gallons from gravel springs at Hanworth, and 25 million gallons additional from the Thames—a total of 87 million gallons. The cost of the extra works he estimated at £3,470,000.

The CHAIRMAN: Does your estimate of £3,470,000 up to 1937 suppose that you are independent of all the other Companies, and get your supply yourself?

Witness: It does.

If there could be interchange between the Companies, would you save money?—Probably we could.

Cross-examined by Mr. FREEMAN: He had no means of ascertaining what amount of water was sent down the Lea for navigation purposes last year. The quantity that would flow in below Feilde's Weir would be small in dry weather—last year probably under a million gallons a day. The only difference between Sir A. Binnie's figures and witness's, was as to the storage required to meet the conditions of the year 1898. The largest quantity the Company had pumped from their wells in any one day was 11 million gallons. This extended over some weeks.

By Lord R. CECIL: The height of the surface of the ground at the Company's well at Lea Bridge was 22 feet, and at Walthamstow about 38 feet above Ordnance datum. The rest level was about 6 feet at the former, and about 30 feet at the latter, below Ordnance datum, for two months from June, 1897. The conclusion he drew from being drowned out at one well was that there was a large supply of water, and that it was worth while to put down more machinery and go on tunnelling.

The CHAIRMAN, in response to a request from Mr. Pope as to the order in which the Counsel, on the conclusion of the evidence, should speak, said the Commission thought the course pursued in giving evidence should be followed.

The Commission then adjourned.

THE INTERCOMMUNICATION SCHEMES OF THE LONDON WATER COMPANIES.

In the notice of the recently issued interim report of the Royal Commission on the Metropolitan Water Supply which appeared in the "JOURNAL" for Jan. 24, we were only able to give an outline of the three schemes for the intercommunication of the different systems which had been submitted to the Commissioners by the London Water Companies. The following is the text of this portion of the report:—

Scheme No. 1 was drawn up by the Engineers of the eight Companies collectively, and their report is dated the 18th of October, 1897. It was stated by Mr. Collins, one of the Engineers of the New River Company, that the scheme was framed with a view, not of providing for the failure of a source of supply, but for an interchange of water for temporary purposes only, such as the failure of a pumping-engine, the fracture of a main, or the temporary displacement of works. The essence of the scheme was the utilization of the surplus water of the Chelsea Company; this being the only Company, except the New River, which, in his opinion, had any material quantity of water to spare at the time the scheme was framed.

Besides the delivery of unfiltered water by the New River Company to the East London Company through the channel of the River Lea, the scheme proposes connections between the mains of those two Companies for the interchange of filtered water. Connections are also proposed between the Campden Hill reservoir of the Grand Junction Company and the Maiden Lane reservoir of the New River Company, and between the mains of those two Companies and the West Middlesex Company, by means of which the three Companies would be enabled to interchange supplies of water. A main under the Thames is proposed to connect the Putney reservoir of the Chelsea Company with the Campden Hill reservoir of the Grand Junction Company, so that those Companies could interchange filtered water. Among other connections proposed in the scheme, is a main passing through the Thames Subway, and connecting the system of the Southwark and Vauxhall Company with that of the East London Company. This main was laid some weeks ago; and large supplies of water have been delivered through it into the East London Company's district.

It is stated in the report that the Engineers have based their calculations on a maximum daily interchange of 10 million gallons, and the cost is estimated at £307,867; but it would appear that this sum does not include the outlay which would be necessary in order to enable the Grand Junction and West Middlesex Companies to filter, pump, and convey to the points of connection the maximum quantity proposed to be transferred daily in case of need by each Company. This scheme could not come into full operation until the works necessary to make the whole supply from the Chelsea Company available were completed, which, it was stated, would take twelve months.

Scheme No. 2 is described in an amended report of the Engineers of the London Water Companies, dated the 24th of October, 1898. It was stated in evidence that it had been prepared with special reference to the circumstances of this year [1898], and with a view to the constitution of a permanent resource against the recurrence of failures of supply in consequence of protracted drought.

The works of the Southwark and Vauxhall Company at Battersea comprise plant capable of filtering 15 million and pumping 25 million gallons daily. Unfiltered water is conveyed from Hampton to Battersea by means of a 36-inch main, and special engine power is provided at Hampton for the purpose of pumping the river water through the main. The Southwark and Vauxhall Company have nearly completed works at Hampton, comprising reservoirs, filters, and pumping-engines, in substitution of the plant at Battersea; and the Company had proposed ultimately to dismantle the Battersea works and to sell the land.

The project called Scheme No. 2 contemplates the acquisition of so much of the site and works at Battersea as might be necessary, of the main from Hampton to Battersea, and of the connected pumping-engines at Hampton, by the Associated Companies, with the view to the formation at Battersea of a distributing centre where the reserve supplies of the Companies, or some of them, may be concentrated, and then delivered into the service reservoirs of the Companies as and when required, or in the case of the East London Company and the Chelsea Company, into the pipe systems of those Companies.

For this purpose it is proposed to lay connecting mains by which certain reservoirs of the Grand Junction, New River, and Lambeth Companies can be supplied from Battersea. Other mains connect the New River Company's system at Clerkenwell, through the Campden Hill reservoir, with the West Middlesex Company's works at Hammersmith and the Grand Junction Company's works at Kew, and the Nunhead reservoir of the Southwark and Vauxhall Company with the East London Company's system. Further connections are proposed which will couple up the mains of the Lambeth, Southwark and Vauxhall, Chelsea, and Kent Companies.

The estimated cost of the mains and connections is £255,346. But to this must be added the cost of purchasing or renting the necessary area at Battersea, and the cost of purchasing the 36-inch main from Hampton to Battersea, and the pumping-station at Hampton; so that the total capitalized outlay would probably exceed £500,000. It was alleged that the whole scheme could be completed in eight months; but we think this is too sanguine an estimate.

The third scheme is, in effect, a portion of Scheme No. 2, and has already been partially carried out, and put into operation to meet the emergencies of the present year [1898]. It was suggested by Sir Henry Knight as being quite sufficient, if completed, to meet the case of a drought similar to that of 1898, if it should occur in the immediate future. This was on the assumption that no Company, except the East London, would be affected by such an occurrence; and no doubt the experience of 1898 justifies that assumption.

The various contributions of water which could shortly be made available, according to Sir Henry Knight, in aid of that Company, if required, are as follows:—

Company.	Gallons per Day.
New River	6,000,000
West Middlesex and Grand Junction	3,000,000
Southwark and Vauxhall	10,000,000
Kent	2,000,000
Chelsea	3,000,000
Total	24,000,000

The additional works necessary in order to secure the above supply were stated to be a main from Nunhead to the Thames Subway, and connections between the Kent and Chelsea mains and those of the Southwark and Vauxhall Company. It would, however, be necessary to add to these items a 24-inch main from the Campden Hill reservoirs to Poland Street. The total cost of these works, as stated in the report on No. 2 Scheme, would be about £64,000.

KETTERING WATER-WORKS ARBITRATION.

Thursday, Jan. 26.

(*Before Mr.* Edward Wood, *Umpire.*)

The proceedings to fix the price to be paid by the Kettering Urban District Council for the undertaking of the Kettering Water-Works Company (see *ante*, p. 38) were resumed to-day at the Westminster Palace Hotel. Mr. James Mansergh was Arbitrator for the Council; and Mr. Charles Hawksley for the Company.

Mr. Balfour Browne, Q.C., and Mr. A. J. Ram appeared for the Council; Mr. Freeman, Q.C., Mr. Honoratius Lloyd, and Mr. R. D. Adkins represented the Company.

Mr. Balfour Browne, in briefly outlining the case for the Council, said they had to ascertain the value of the undertaking on the basis of what it was earning, with a view to what was likely to happen in the future. In order to ascertain what the future of the Company was, they had to discover several things—what they were earning to-day; what they were supplying at present; and what their resources were to meet the future requirements of the districts. The other side had put in a calculation based upon the present value of the undertaking, to which they had added the prospective value. But to find the present value of the concern they must know, not only that the income was earned, but that it was legally earned and well-secured. If, for instance, the population required 30 gallons a head, and could only get 10, although the Company might still be obtaining their income, nobody would call it well-secured, because the certainty would be that the Local Authority would intervene, and the Company would be ousted. If, on the other hand, the Company had large resources of water, and the prospect of earning more, this ought to be considered. The causes of the action taken by the Corporation in the present case were complaints as to pressure and as to the high rates; and it was partly on these grounds, and partly on those of general policy, that Parliament consented to the purchase. Counsel proceeded to quote at length from Mr. Freeman's speech before the Parliamentary Committee, in which he admitted (as Counsel held) that the pressure was defective, and offered to bind the Company to provide works to ensure high pressure, and also, if the Committee would throw out the Purchase Bill, to reduce their charges to the level proposed by the Local Authority. Turning to the Company's valuation, he said the income with which Mr. Eaton started was not a safe basis, because it could not be continued unless a large expenditure was incurred to remedy the admittedly defective pressure, and because they promised themselves to reduce the rates. Therefore, although the income was earned in one particular year, it must be capitalized at a lower number of years' purchase than would be reasonable with an absolutely first-class undertaking. The Company admitted that their present income could only be secured by giving extra pressure, which was to be obtained by making a reservoir at Loddington, to which place the water would be pumped. Yet no addition to current expenditure was made to correspond with this outlay. The figure of 36 years' purchase, Counsel characterized as the most ridiculous that had ever been placed before an arbitrator. The principle to act upon was to give the Company, after the purchase, the same income with the same security; but the Company proposed to treat their income as if it were as well secured as Consols. No water company in this country was worth anything like 36 years' purchase. That in the present case the Company were absolutely wrong was proved by the fact that, whereas the interest paid by the Kent Company showed that it was a 3¾ per cent. security, the sum claimed would make the Kettering concern a 2¾ per cent. security, which was ridiculous. He contended that the Council would be very liberal if they gave 30 years' purchase. Beyond Mr. Eaton's allowances for new filters-beds, the cost of a reservoir ought to be deducted, because if the Company had continued they would certainly have had to make the Loddington reservoir, which, according to Mr. Eaton, would cost £6000. Also there should be deducted the cost of mains from the existing Cransley reservoir to the high-level reservoir at Loddington. Mr. Eaton had overlooked the latter item altogether; and when challenged on the point, he said it was included in a sum of £3500 in his valuation. But this was not the case, because the £3500 was for extensions of mains for seven years, to meet the growth of the district. The water from the Loddington reservoir had to be supplied in ten hours daily; and it would be shown that, with the existing pipes, it could not be got into the town, and thus enable them to earn the future income, unless another main were laid. The claim for prospective value depended upon two fallacies. Mr. Eaton calculated on an amount of water that he had not got; and then that he was supplying a smaller number of people than was actually the case. This error arose through taking five persons per house, when, as a matter of fact, the right figure was 5·3. In this way, the Company made the population supplied 16,335, whereas the number was actually 17,315; so that the Company were at present supplying 1000 persons more than they thought. The result was that the figure in the accountants' tables of 29·74 gallons per head daily as the consumption was wrong, and should be 28·06. One of the ways by which Mr. Eaton showed the enormous prospective value he calculated on, was by reducing the supply of 20 gallons per head for domestic consumption to 18; but as the consumption was not 20 gallons, but 19 gallons only, this claim was obviously wrong. Moreover, the concern was badly managed to allow this waste, or else against the saving he would have to put the expense of more inspectors and relaying pipes to remedy the waste—all of which was ignored in the calculations. Then Mr. Eaton took 16 inches for evaporation over the whole water area and the water surface; while they had it from Mr. Hawksley, when giving evidence in the House of Commons, that 16 inches was the right figure for land alone, it being 30 or 32 inches for water surface. Mr. Eaton also calculated on getting from Weekley and Clover Hill 190,000 gallons a day; but a test showed that from the two sources together, on the average, there was available only 120,000 gallons. The sum that must be deducted in order to arrive at the net income amounted in all to £17,195; and Counsel gave in detail the items. These had already been mentioned by Mr. Burstal in his evidence, together with the figures as to future increase. With reference to the figure of 4·52d. per 1000 gallons (the rate of profit in 1898), he pointed out that this had been steadily decreasing; it being 5·60d. in 1894, 4·64d. in 1895, 4·84d. in 1896, and 4·63d. in 1897. Under these circumstances, it was no injustice to assume that for the 1¾ years that the surplus water from the Cransley reservoir would last, it would produce the same profit. This would give a sum of £479, which, capitalized at 25 years, would make the total prospective value of the Cransley water £11,975. The total quantity from Weekley and Clover Hill that could be relied on was 110,000 gallons daily, or less 27,000 gallons supplied to the brewery and 8000 gallons supplied to Weekley, 75,000 gallons. Though this water was not as good as that at Cransley, it was treated as such; and on this basis, taking the profit at 4·52d. per 1000 gallons, it represented £515, which, capitalized at 25 years, gave £12,875. Mr. Eaton admitted that the working of separate establishments at Cransley, Clover Hill, and Weekley would involve extra expense; and this was estimated by the Council's witnesses at £150 per annum, which, at 25 years' purchase, equalled £3750—reducing the £12,875 to £9125. This latter figure, added to the £11,975, gave the total prospective value as £21,100. The whole valuation was £86,029. In conclusion, Counsel dwelt at some length on the claim of 10 per cent. for compulsory sale; suggesting that, having regard to the expenses of winding up, &c., which the Council were to bear, an allowance of 1 per cent. would be ample.

Mr. *E. K. Burstal*, who was under cross-examination when the last adjournment took place, was further cross-examined by Mr. Freeman. He believed there was exactly the same provision in the Harrogate Act for winding-up, compensating officers, &c., as in the Kettering Act; and notwithstanding this he claimed on behalf of the Company the 10 per cent. He could not say whether it was allowed or not. When before Parliament, he complained of inefficiency of pressure and want of filtering power on the part of the Company. Some of the upper parts of the town were not properly served as regards pressure; and in case of fire, there would be not only delay in getting water but lack of pressure when it was turned on. In his valuation, he commenced by taking the net profit for the year to June, 1898 (£3339), from which he deducted the debenture interest at 4 per cent. After looking at the accounts, he agreed that the debentures had recently been taken by the Leicestershire Banking Company at 3¾ per cent., repayable at seven days' notice. If this notice was at the option of the borrowers, and the Bank Company could only require repayment on twelve months' notice, it would only slightly modify his views as to the interest. The item of £150 for additional cost of coal and labour, consequent upon pumping to the Loddington reservoir to give increased pressure, was necessary; the pressure being insufficient at present. There were many houses above the 300 feet contour line which were inefficiently served as regards pressure. He did not agree with Mr. Balfour Browne that no water company in England was worth 36 years' purchase; he claimed this number of years in the Harrogate case. Harrogate, however, was in a much better position than Kettering; the latter being practically a one-trade town. The items covered by the figure of £15,995 in his valuation were not all required for the future supply of the district. He could not say any of it was necessary in connection with an obligation which the Company could be compelled to carry out. He calculated the cost of the new reservoir at £8 per 1000 gallons. He did not know that the Clover Hill reservoir cost £4 5s. 6d. per 1000 gallons. His estimate included land and fencing. At present prices, a reservoir at Kettering could not be constructed at anything like £4 5s. 6d. per 1000 gallons. For work alone the cost would be considerably over £6. With regard to the 15-inch main from Cransley reservoir, for which he had allowed £1980, it was suggested that it could be done without, by re-arranging the use of, and pumping in connection with, existing mains; but witness held that the suggestion was faddy, and would be unsatisfactory. It was also put to him that the extra engine power at Cransley, for which he allowed £1400, was not needed; but here also he

maintained it was required to lift the water to the Loddington reservoir in sufficient quantities. He had estimated the daily supply from Cransley reservoir at 563,555 gallons; but he accepted 581,932 gallons as the quantity. This would make the amount of surplus water 88,100 gallons, and so affect other portions of his valuations. But as against this error, he pointed out that he had not discounted the prospective values back to the present time, which would make a difference of £1600 in his valuation. The reason he took 25 as the multiplier in capitalizing the prospective income, and not 30 as in the case of the present income, was that it was not so well secured; the town being largely a one-trade place, and the Company having one very large consumer, which was always an element of risk. His figure of the yield of Weekley and Clover Hill—110,000 gallons a day—he took from evidence given before Parliament in 1889. He had heard of the experiments made since, which give 190,000 gallons a day; but he did not consider them exhaustive. He did not know that since 1889 the headings had been extended. Witness admitted he had by error deducted the 8000 gallons supplied to Weekley twice. He was pressed with regard to the £150 per annum which he had deducted, in estimating the prospective value, as additional working expenses to utilize the Clover Hill and Weekley water; it being suggested that the figure of 40 per cent. for working expenses would cover this item. Witness declined, however, to admit that this expenditure would not be required in addition to the present outlay. The figure of 40 per cent. was not excessive for working expenses. As to reducing the supply per head, he failed to see that a consumption of 18·77 gallons per head was extravagant. Two good inspectors could no doubt lower it to 18 gallons; but the cost would be more than the value of the water saved.

Mr. *Henry Smith*, of Messrs. J. Simpson and Co., Engineers, who erected the pumping-engines at the water-works, said they were triple expansion, and designed to lift 500 gallons a minute 82 feet high. To increase the head, the plungers would have to be altered. In economical working, each engine would be capable of raising from 330 to 350 gallons a minute 160 feet, which he understood was to be the level of the new reservoirs. The engines were originally made rather larger than was required. The cost of the alteration suggested would be about £100. To raise to a height of 160 feet the quantity of water that was now pumped, would necessitate another engine.

Cross-examined: If the present engines, with the alterations suggested at a cost of £100, were to work 24 hours a day, they would be able to raise to a height of 160 feet the water now pumped.

Mr. *G. H. Hill*, examined by Mr. Ram, handed in a valuation of the undertaking similar to that of Mr. Burstal. Like Mr. Burstal, he brought out the capitalized value of the present income as £81,720. In calculating the future value, his estimate differed chiefly from Mr. Burstal's in respect of the 8000 gallons supplied to Weekley, which Mr. Burstal had included in his valuation twice. In this way, he obtained a final total of £88,450, as the capitalized value of present and prospective incomes.

Cross-examined by Mr. Freeman: If a company were performing their statutory obligations, he should not, in valuing, charge anything against their present income. He thought the Kettering Company were not fulfilling their statutory obligations with regard to the higher parts of the town. Counsel read the section of the Act under which the Company were not bound to supply except by gravitation; and in face of this, witness said he could not hold they were under any obligation to supply at greater pressure than they were doing. With regard to the yield of Weekley and Clover Hill, he thought the tests made when no proceedings of the present kind were coming on were far more reliable than the three months' trial last year. He therefore preferred to take the yield at 110,000, and not 190,000 gallons. The future expenditure which he had allowed for was necessary to render available the water the Company had. As to the 10 per cent. allowance for compulsory sale, witness said it used to be allowed; but it had now become the custom to include within Acts so many things which should be deducted from the 10 per cent., that this amount was no guide at all. He had not as a rule allowed the 10 per cent., though he did so in the Ystrad case. If it was not for the clause in the Act about payment to officers and winding up, he should say the 10 per cent. ought to be allowed.

Friday, Jan. 27.

Mr. *G. M. Taylor* said he prepared a valuation which practically agreed with those of Messrs. Burstal and Hill. As to the construction of the 15-inch main to Loddington reservoir, and of another 9-inch main thence to the town, proposed by the Council, he handed in diagrams showing these mains and the 12-inch main which the Company proposed to lay. The only assumption in the diagram was that the discharge from the mains into the cisterns was 375 feet above Ordnance datum, which was not unreasonable. When two engines were pumping at Cransley, which was in the middle of the system, at the rate of 141 cubic feet a minute, with the 12-inch mains, 667 gallons a minute would be going into Kettering and 211 gallons into Loddington. For the proper quantity to be delivered into Kettering, the main should be big enough to deliver the whole of the water available in ten hours; so that they would be 213 gallons a minute short of the quantity they ought to deliver. When the main was acting as a gravitation main, only 547 gallons a minute would be flowing into Kettering, which showed a shortage of 333 gallons a minute. On these calculations, witness was of opinion that the Company's proposal to utilize the 12-inch main and to lay a 12-inch main to the reservoir, was not sufficient. The plan of the Council's Engineers was to put a 15-inch main from Cransley pumping-station to Loddington reservoir, and to lay a second main, 9 inches in diameter, to supplement the 12-inch main at present in existence. He had made calculations showing that this main when pumping would deliver into Kettering 945·6 gallons a minute, and when not pumping 844 gallons a minute. There had been complaints as to insufficient pressure; there being only one system supplying both the higher and the lower parts of the town. Apart from any new works, the Company could have secured a better pressure if they had adopted different means of distributing their water. In a town which was falling in all directions, there should have been a high-level zone of mains, isolating the lower portions of the district. The result of this would have been that the lower portion would not have been able as now to deplete the upper portion. If the mains were in bad condition, a great outlay would be required to repair them, especially as the Council intended to increase the pressure.

Cross-examined: His diagram was based on the assumption that the mains were to deal with the whole available supply from Cransley, and then that they were to be capable of delivering the supply in ten hours. The agreed figure of the average daily yield of Cransley was 546,932 gallons. The water from Cransley was at present pumped through the town to the high-service reservoir at Clover Hill. It was occasionally pumped to the high-service tank at Clover Hill. If there were an outlet from the pumping-main to Warren Hill reservoir, this reservoir would dominate the pressure of the whole district. If they pumped to Warren Hill at night and to Clover Hill in the day, the low-lying districts would be fed from water at Warren Hill, and also from the overflow from the high level at Clover Hill. This would have the effect of increasing the pressure on the high zones; but it would give a very poor amount of storage, as the tank did not hold more than 40,000 gallons, which was certainly quite inadequate for the needs of the upper part of Kettering. Witness admitted that the Clover Hill and Warren Hill reservoirs were practically on the same level; and that therefore both would be available for supplying the low-level district, while the higher portions of the town could be supplied by continual pumping. He did not think, however, that this would do away with the need of having a further main. It would have the effect of giving the upper parts of the town a very precarious supply, owing to the smallness of the tank at Clover Hill.

Re-examined: Supposing the scheme suggested were carried into effect, it would require an increased staff to do the pumping, and there would be the expense of zoning the district and constructing a bigger reservoir at Clover Hill. The gain therefore would not be much. If there were to be continuous pumping, there would have to be at least two, and perhaps three, shifts of men.

Mr. *T. Smith*, Engineer and Surveyor to the Kettering Urban District Council, said that in excavating to carry out surface drainage works he had exposed the water-mains in various places; and he handed in a statement showing which were found to be defective. In four cases they were badly cracked and the water was escaping. Judging from what he saw, he calculated that 7600 yards were defective. In many houses in Kettering, it was necessary to have cisterns if a supply was to be obtained above the ground floor. This applied generally to places above, and also to some on, the 300 feet contour line; and about one-third of the houses in Kettering were above or on this line. On this area, the pressure would vary from 39 to 21 feet where the houses were thick.

Cross-examined: He would not accept the suggestion that the cracks in the pipes were caused by the picks of the men excavating; there was a great difference in the appearance of old and new cracks.

Mr. *Frank Ballard*, a member of the District Council, said he should estimate that 85 per cent. of the people of Kettering were dependent on the boot trade. He had some cottages in the town which used to be supplied with water by the Company; but owing to the excessive charges and short supply, he had provided wells. This had also occurred in connection with other property in the town.

Mr. *Wm. J. Payne*, a builder, said that when laying a drain in Kettering his men uncovered a water-main which was in a corroded condition and leaky in many places. From one or two lengths, the water escaped in all directions. He also spoke as to the leaky condition of the pipes in other parts of the town.

Mr. *Charles Henson*, a member of the District Council, said he was engaged in the building trade, and knew the site of the proposed reservoir at Loddington. The cost of carting bricks would be about 9s. a thousand. He also referred to the defective condition of a 3-inch main he uncovered in 1888, which subsequently broke, and the iron of which was found to be of the thickness of a penny.

This concluded the evidence.

Mr. Balfour Browne, on behalf of the Council, said the first point that arose was as to whether the interest should be taken at £425 or £413. The figure in the accountant's tables was £425, which he accepted; it being the sum which he held the Company would have to pay if they continued in existence, and the £413 being the result of a temporary arrangement. The next important difference was as to the reduction of £150, in connection with the cost of labour, coal, &c., for pumping the supply at Cransley. Both sides agreed that the water, to be given at greater pressure, must be raised to a higher level; and this was recognized to some extent, because the Company's valuers allowed £6000 for the cost of a new reservoir. Yet they left out the cost of getting the water there. The figure of £150 was not gainsaid, as he understood, in amount; but it was disallowed on principle. Perhaps the most important point was as to the multiplier to be applied to capitalize the net income. He repeated his statement of the previous day that no water company in England was worth 36·36 years' purchase; and this Company was far from being the best in England. The pipes had been down 25 years, and a large proportion of them were of small diameter. Then the Company were nearly at the end of their resources, which they admitted would be exhausted between 1905 and 1906. After that date, they would have to seek new sources of supply; and then if they came to Parliament and had not reduced their charges, according to Mr. Freeman's pledge, the Council would appear and compel a reduction. As to the improvements in the supply which the Council's engineers suggested, Counsel said that while they were not required to enable the Company to meet their statutory obligations, they were what a prudent company would undertake of necessity—knowing that otherwise there would quickly be an application to Parliament. Another element militating against the security of the income was supplied by the discounts under the rates in the Act, which, though they had no information on the point, he believed would amount to £900 a year. If this were a fact, away would go the maintainable income. This was an important consideration in settling the number of years' purchase, which he urged should be at the outside 30. The prospective value of the concern depended on how much water they had, and how many people they were at present supplying. It had been shown that the Company were not supplying 20·74 gallons per head, but much less; and he did not think they could be allowed to say, first, that this was a well-managed Company, and then that there was a large amount of waste which could be stopped. The supply of 190,000 gallons from Weekley and Clover Hill was really only 110,000 gallons in all. Even if the supply—which was not now being worked because it would be uneconomical and bad management—were to be made available, it would involve two staffs; and that was why when calculating for prospective value, they must deduct an amount for further working expenses. A new method of working

at Cransley had been suggested by the other side; but this would be dearer than to have a new engine. The extra Cransley mains were what a prudent company would provide; and they ought also to be made the subject of deduction. If the Company had been allowed to continue, they would have reduced the rates and increased the pressure, as Mr. Freeman pledged them to do in Parliament. The Council were therefore entitled to consider these as things that would be done; and they undoubtedly militated against the security and maintenance of the existing revenue. Counsel, in conclusion, dealt at some length with the 10 per cent. question; asserting that, as the Council were to pay explicitly for a number of items usually included in the percentage, the amount must be correspondingly reduced. He should say that if something for the cost of re-investment was given, it would be enough. Parliament had never allowed anything for mere compulsion.

Mr. Freeman, for the Company, referred, in opening, to the debenture interest; contending that, as they had been able to borrow the money at ¾ per cent. less than formerly, they should be given the benefit of this reduction. With regard to the £150 in respect of the Loddington reservoir, he denied that any deduction representing cost of labour should be made from the income being earned by the Company, seeing that at the time the Council came to buy the undertaking it was admitted that they were doing their statutory duty. He drew a clear distinction between works necessary to earn the existing income and works necessary to supply future increases. The pledges he had given in Parliament were only on the basis that he was to remain in possession of the works. One pledge was that the Company would reduce the rates; but this would not mean reduction of income, because Kettering was a rapidly increasing place, and a new assessment was about to come into force, so that the reduced rates would be on the new assessment, and one would balance the other. As the Company were not to remain in possession, they must not put on them the obligation to redeem these pledges. Therefore he said no part of the £150 ought to be allowed. With reference to the number of years' purchase, he claimed, having regard to all that had been proved, that this was a first-class security. On the point of what was to be allowed for a first-class security there was open war between Mr. Balfour Browne and Mr. Burstal; the latter admitting that in the Harrogate case he allowed 36·36 years. Counsel reviewed the circumstances of the two cases in detail; asserting that the Kettering Company were in at least as good a position as the Harrogate Company, and that what was fair for Harrogate was fair for Kettering. Certainly, no evidence had been given to justify the large difference made by Mr. Burstal. With regard to the deductions for capital expenditure necessary at the present time to utilize the Cransley reservoir to its full capacity, he absolutely joined issue that, except as to the filter-beds for which the Company had allowed, they were to be set against the existing water supply. He agreed that to meet the growing requirements of the district certain further works would have to be undertaken; but for the expense they would receive further remuneration. The £6000 for the extra reservoir was the same as the estimate of the other side; while the Company's valuers had actually allowed more for filter-beds than their opponents. He also agreed there must be an increase of mains to connect with Cransley, but not to the extent of a 15-inch main, &c., as suggested. A 12-inch main, costing £1200, would be amply sufficient for the purpose. He entirely disputed that the enormous length of 9-inch main referred to would be required. If the principle were adopted of zoning the town, and a 9-inch main were carried between Warren Hill reservoir and Northall Bridge, and from this point distribution were made to the lower parts of the town, very great saving would be effected, and there would only be the necessity of laying a 9-inch main at a cost of £726. The necessity for a 15-inch main as compared with the Company's 12-inch one was said to be the delivery of water in ten hours. Although this might be a good way of doing it if they were laying out a new system, yet taking things as they were the method proposed by the Company of working longer hours was better. Passing on, he drew attention to Mr. Eaton's figure of £3500 for seven years' extensions of mains, which would have to be modified in view of the fact that the figure of five persons per house they were now told, in the light of the census returns, was erroneous. This would reduce the sum to £2750. The total expenditure for new works amounted to £13,926. The figure given by Mr. Eaton as representing the prospective profit was £77,000; but on the census returns this should be £70,934, against the £23,500 of Mr. Burstal. Counsel went on to complain that Mr. Burstal's method of calculating the future profit on the water of the Company at 4·52d. per 1000 gallons—the figure for 1898—was unfair; the profit for that year being very low. As to the capitalization of the future profits, there was no reason why this should be done at 25 years (against 30 years even by the Council in the case of the present profits), seeing that there was no sign of decreasing prosperity. It was held by the other side that increased expense would result from the utilization of the Clover Hill and Weekley supplies; but he contended that, as the Company were now at an unnecessarily high figure of working expenses (40 per cent.), the extra cost could be covered by this figure. Continuing, the learned Counsel briefly stated the figures of Mr. Eaton's valuation, after certain small alterations had been made, as follows: Capitalization of present income, £101,417; amount of prospective value, £70,934—total £172,351. Deduct £13,926 for works, and add 10 per cent. (£15,842), making £174,267, which, *plus* £400 for fishing and grass, brought out a final figure of £174,667. Regarding the 10 per cent. allowance, beyond all doubt it was intended that besides the allowances specifically mentioned in the Act, this percentage in full should be given the Company.

Some conversation then passed as to the date of transfer, which it was eventually understood should be June 24 next.

The proceedings then terminated; the Umpire stating that he would reserve his award.

Water Supply and Typhoid Fever at Kildwick.—There has been an outbreak of typhoid fever at Kildwick, and, up to the morning of the 1st inst., five deaths had occurred. The Medical Officer (Dr. Atkinson) analyzed the water supply on the 20th ult., but could find no traces of contamination by sewage or other organic impurity. In spite of this, he suspected that the water supply was at the bottom of the trouble, and made some subsequent tests, which proved that sewage found its way from Kildwick Hall into the tank supplying the district.

WEST MIDDLESEX WATER-WORKS COMPANY.

A Special General Meeting of this Company was held at the Offices, Marylebone Road, last Tuesday—Mr. Boulnois, M.P., in the chair—to consider the Bill proposed to be introduced into Parliament this session to confer further powers upon the Company "with respect to the construction of works, the taking of water from the River Thames, the raising of capital, and for other purposes."

The Secretary (Mr. F. H. Wybroo) having read the notice convening the meeting,

The Chairman stated the objects of the Bill, as set out above, and reminded the shareholders that at their last half-yearly meeting he foreshadowed that it would probably be necessary to introduce a Bill into Parliament giving the Company further powers. Their district was growing so rapidly, and the supplies which they required to put on were becoming so numerous, that it was necessary for them not only to deal with the immediate present, but also, as prudent men, to look ahead somewhat considerably. The Bill included, among other things, the taking of more water from the Thames; but this was really only a temporary measure. No objection could be raised to the taking of additional water, as Parliament had already empowered them to draw some 15 million gallons daily from the river beyond the statutory rights which the Company already possessed. When the Staines reservoirs were completed, they would ask Parliament to abandon the rights which they now wished to have conferred upon them in regard to taking more water from the Thames. He supposed that they must, as usual, be prepared to face opposition to the Bill by the London County Council. No Bill had been introduced by any Metropolitan Water Company for the benefit of the consumers and for the purpose of carrying out the obligations which Parliament had imposed on the Companies, which had not hitherto been strenuously opposed by the County Council. The policy of this body had always been, on the one hand, to do all they could to prevent the Companies from obtaining from Parliament the necessary powers for carrying out the duties which had been placed upon them—duties which must arise from the increasing population, the extension of business, and other contingencies occurring from time to time—and, on the other hand, to declare before Royal Commissions, Select Committees of the House of Commons, and even on the floor of the House itself, that the Companies were no longer able to fulfil the conditions which had been placed upon them by various Acts of Parliament. The only tribunal which the County Council had not had the courage at present to face was that set up by Parliament in 1897 for the purpose of hearing and judicially determining whether charges which were brought against the London Water Companies could be justified or not. This tribunal was the Railway Commissioners. They must therefore not expect, as he had said, a completely unopposed passage through Parliament for their modest little Bill; but believing that it was solely in the interest of the consumers, the Directors would nevertheless push it on as far as they possibly could. For his own part, he had little doubt that Parliament would ultimately sanction the Bill.

The Solicitor (Mr. Gillett) then explained the provisions of the Bill.

The Chairman afterwards moved a resolution approving the Bill, "subject to such additions, alterations, and variations as Parliament may think fit to make therein."

The Deputy-Chairman (Mr. Jackson Hunt) seconded the motion, which was carried unanimously.

Another Special General Meeting was held subsequently to consider "A Bill for Improving and Facilitating Intercommunication between the Mains and Works of the Metropolitan Water Companies."

The Secretary having read the notice calling the meeting,

The Chairman stated that the Bill before them might really be called an Insurance Bill. Assuming for the moment—although he could hardly believe it—that they should have another summer such as they had last year of drought and dryness (and the proprietors would remember it had been stated that there had not been such a season known for eighty years), it might be necessary to accord help to the East London Company to enable them to give a full constant supply. He did not, however, think that any other of the Metropolitan Water Companies were at all likely to require any assistance under the Bill. They would remember that all the Companies passed through the extraordinary and unprecedented drought of last year without trouble or anxiety; and the consumers in all the districts—with the exception of those of the East London Company for a short time—were able to indulge in any amount of water they cared to use during the hot and dry period. It was, however, of course within the bounds of possibility that any one of the other Companies might break down through some unforeseen circumstance; and therefore they had agreed among themselves to provide against this. His observations at the previous meeting respecting the opposition which was likely to be encountered from the County Council to the Bill submitted to that meeting would probably also apply to this measure. The County Council took a delight in opposition, especially to the Water Companies. When, however, the Companies set about opposing the Bills introduced by the County Council in a business-like and parliamentary manner, "A London Ratepayer" was put up to protest against what they were pleased to call an abuse, and a long letter was written to the newspapers asserting that the Companies had no right whatever to act in the manner they were doing—that was to say, to take the usual parliamentary proceedings to prevent the County Council's Bill from coming before the House of Commons. He was therefore not really sanguine that more money would not be wasted upon the Bill before the meeting, especially as the County Council had no remedy whatever themselves to suggest against the possibility of a short supply of any one Company through unforeseen circumstances. He might state that the Bill carried out practically entirely the interim recommendation of the Royal Commission now sitting; and he did not know that if the Commissioners themselves had set to work to frame a Bill they could have put one before Parliament which would have better and more clearly embodied the views which they had expressed in their report. This being the case, he believed that there would be no difficulty whatever in getting the assent of the Local Government Board to the Bill, and in its ultimate passage through Parliament.

The Solicitor having read the preamble of the Bill, and drawn attention to its chief clauses,

The Chairman proposed a resolution approving the measure.

A Proprietor asked whether the other Metropolitan Water Companies intended to introduce similar Bills.

The Chairman replied that the Bill before them was a joint one of the eight Companies.

The Deputy-Chairman, in seconding the resolution, said he regarded the Bill as one of the most important which had ever been introduced into Parliament by the London Water Companies.

The motion was carried unanimously; and the proceedings then terminated.

THE HAMPTON DISTRICT COUNCIL AND THE WEST MIDDLESEX WATER COMPANY.

The Company's Bill to be Opposed.

At a recent meeting of the Hampton Urban District Council, the Chairman (Mr. G. Sanders, J.P.) moved—"That the Council oppose the Bill being promoted by the West Middlesex Water-Works Company in the ensuing session of Parliament." He said he should like to see the motion carried, because the Council would then be in a position to treat with the Company, and to safeguard, as far as possible, the interests of the parish. The Company said their Bill as it stood was before the House of Commons, and they were unable to alter it. But he said they were able; and if they would not meet the Council, they would have to go before the Committee of the House of Commons, and ask for the insertion of such clauses as they felt were necessary and just. He suggested that they should insist on three points as a condition precedent to the withdrawal of their opposition. The first was that the Company should be compelled to show exactly the line along which they proposed to lay their main, and that it should be such a line as would not interfere with their present or future sewerage arrangements. Secondly, that the Company should pay, and pay liberally, the wages of some person who, on behalf of the Council, should look after the work while it was in progress, and see that the Company kept strictly within the lines of the Act, and conformed to every arrangement entered into in consideration of the Council withdrawing their opposition. On the third point, some of the members might not agree with him. He always contended that water companies should not be allowed to lay trunk mains in the public highways, but buy a strip of land in which to place them, for which they would have to pay. But if they must use the highways, they ought to be compelled to pay the Council a rent. This was the third clause he should urge the Council to insist upon. Mr. Denning expressed doubt as to whether the Council could make such a demand. The Chairman said if they could get a clause into the Bill, there would be no doubt about the matter. It was urged that the Companies paid heavy rates. This was true; but payment of rates did not absolve a person from payment of rent. They were informed by their Surveyor that the existence of these mains had increased the cost of the sewerage scheme by some £3000 to £5000; and if this were so, the least the Companies should be compelled to do was to pay rent for the privilege. Mr. Higgott said he was told that the Twickenham District Council were going to oppose the Bill because the trunk main was proposed to be laid in a street which had cost them an enormous sum to make up. The resolution was then adopted unanimously; and at the suggestion of the Clerk (Mr. F. A. Kent), it was agreed that the Chairman, the Surveyor, and himself should make an appointment with the promoters of the Bill, accompanied by a detailed scheme, with sections, &c., of at least three alternative routes, and after such interview report to the Council the result. At a meeting held by owners and ratepayers, the resolution adopted by the District Council was unanimously confirmed.

THE HAMPTON RESERVOIR RATING CASE.

An Appeal to the House of Lords Decided Upon.

The Hampton District Council lately had before them the question of the advisability of appealing to the House of Lords against the decision of the Court of Appeal in the case of the assessment of the Southwark and Vauxhall Water Company's reservoir, reported in the "Journal" for Dec. 13, 1898, p. 1362. The Chairman (Mr. G. Sanders, J.P.) having introduced the subject, a member suggested that, as the Assistant Overseer (Mr. Roberts) was present, he should give the Council some idea as to how much they would lose by the decision referred to. Mr. Roberts said he had gone carefully through the whole of the valuations made during the fifteen years he had been connected with the parish, and had had the assistance of Mr. Penfold. The result was that if the decision was made applicable to filter-beds as well as reservoirs, the assessment of which was £10,142, the loss on (say) a 4s. rate for the year would be £1500, or equivalent to a 6d. rate. The Chairman remarked that this statement went beyond the present facts, because the Companies had not up to now raised the question of filter-beds. Mr. Roberts said that Mr. Restler (the Company's Engineer) intimated to him that they intended to raise it. In 1894 they consented to the consolidation of these assessments; but there was nothing to prevent the Companies from going to the Committee at any time, and having each separately valued. The reservoir which had been appealed upon was assessed at £1940, which on a 4s. rate produced in round figures £400. The Chairman said that the Council would drop actually, under the decision of the Court of Appeal, £300 per annum, and stand to lose £1500. Mr. Larcombe moved that the Council take the necessary steps for appealing to the House of Lords. He said he supposed there was no one more averse than himself to the spending of the ratepayers' money on law expenses; but they had come to almost a crisis in the government of the parish as regarded the Water Companies' monopoly, and they must take extreme measures, however much they regretted it, in order to get a final decision upon this matter. Until this had been done, their plea for fresh legislation, if it became necessary, would not be so effectual. It must be remembered that, as the

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 296.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 13	10½	Alliance & Dublin 10 p. c.	22—23	..	4 11 4
100,800	10	"	7½	Do. 7 p. c.	16—17	..	4 8 3
800,000	100	Jan. 3	5	Australian 5 p. c. Deb.	104—106	..	4 14 4
200,000	5	Nov. 11	6	Bombay, Ltd.	6¾—7	+¼	4 5 9
40,000	5	"	6	Do. New, £4 paid	4¾—5¼	+¼	4 11 5
380,000	Stk.	Aug. 12	12	Brentford Consolidated	280—285	+3	4 4 3
240,000	"	"	9	Do. New	212—217	+2	4 2 11
50,000	"	"	5	Do. 5 p. c. Pref.	140—145	..	3 9 0
159,375	"	Dec. 15	4	Do. 4 p. c. Deb.	128—133	..	3 0 2
220,000	Stk.	Sept. 15	11½	Brighton & Hove Orig.	263—268	..	4 5 10
226,320	"	"	8½	Do. A. Ord. Stk.	192—196	..	4 6 9
933,500	Stk.	Aug. 31	5	Bristol, 5 p. c. max.	125—130	..	3 16 11
420,000	20	Sept. 29	10	British	47¾—48½	..	4 2 6
50,000	10	Aug. 12	11½	Bromley, Ord. 10 p. c.	26—28	..	4 2 2
75,000	10	"	8½	Do. 7 p. c.	20—22	..	3 17 3
500,000	10	Oct. 13	6	Buenos Ayres (New) Ltd.	9½—10½	+¼	5 17 1
220,000	Stk.	Dec. 30	4	Do. 4 p. c. Deb.	99—101	+¼	3 19 3
150,000	20	July 14	8½	Cagliari, Ltd.	29—30	..	5 10 0
100,000	10	Sept. 29	7	Cape Town & Dis., Ltd.	14—15	..	4 13 4
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	57—59	..	5 1 8
550,000	Stk.	Oct. 13	13½	Commercial Old Stock	312—317	+2	4 5 2
200,750	"	"	10½	Do. New do.	242—247	+2	4 5 0
200,750	"	Dec. 15	4½	Do. 4½ p. c. Deb.	145—150	..	3 0 0
800,000	Stk.	Dec. 15	10	Continental Union, Ltd.	200—205	..	4 17 7
200,000	"	"	7	Do. 7 p. c. Pref.	187—192	..	3 12 11
51,600	Stk.	Aug. 31	14	Croydon A 10 p. c.	305—310	..	4 10 4
168,400	"	"	11	Do. B 7 p. c.	255—265	..	4 3 0
555,000	Stk.	Aug. 12	5½	Crystal Palace Ord. 5 p. c.	130—135	+3	3 17 9
60,000	"	"	5	Do. 5 p. c. Pref.	140—145	..	3 9 0
486,090	10	Jan. 27	11	European, Ltd.	22—23*	..	4 15 8
354,060	10	"	11	Do. £7 10s. paid	17—18*	..	4 11 9
14,993,075	Stk.	—	—	Gas-light and Coke	4 p. c. Ord.	119—121	..	—
					3½ p. c. max.	102—104	+1	—
					4 p. c. Con. Pref.	126—128	..	—
					3 p. c. Con. Deb.	101—103	+1	—
70,000	10	Nov. 11	8	Hongkong & China, Ltd.	14—15	..	5 6 8
3,800,000	Stk.	"	10	Imperial Continental	229—234	−1	4 5 6
376,400	100	Feb. 1	4	Do. 4 p. c. Deb. Red.	98—101*	+2	3 19 3
473,600	Stk.	Aug. 12	3½	Do. 3½ p. c. Deb.	102—105	..	3 6 8
75,000	5	Nov. 30	6	Malta & Medn., Ltd.	5—5½	..	5 9 1
560,000	100	Oct. 1	5	Met. of 5 p. c. Deb.	112—114	..	4 7 9
350,000	100	"	4½	Melbourne 4½ p. c. Deb.	107—109	..	4 2 7
541,920	20	Nov. 11	5	Monte Video, Ltd.	14½—15⅝	+⅛	6 9 0
617,946	Stk.	Aug. 31	9½	Newc'tle & Gatesh'd Con.	232—236	..	4 2 8
252,355	Stk.	Dec. 30	3½	Do. 3½ p. c. Deb.	107—110	..	3 3 8

Issue.	Share.	When ex-Dividend	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
150,000	5	Nov. 30	8	Oriental, Ltd.	7⅛—7⅜	..	5 8 3
135,000	5	"	8	Do. New, £4 10s. pd.	6¼—6⅜	..	5 6 8
15,000	5	"	8	Do. do. 1879, £1 pd.	1¼—1⅜	..	4 11 5
60,000	5	Sept. 29	7	Ottoman, Ltd.	5—5½	..	6 6 2
500,000	100	Dec. 1	6	People's Gas 2nd Mtg. of Chicago Bonds	102—106	..	5 13 2
848,070	10	Oct. 13	6	River Plate Ord.	9¾—10¼	..	5 17 1
250,000	Stk.	Dec. 30	4	Do. 4 p. c. Deb.	100—102	..	3 18 5
250,000	10	Sept. 29	10	San Paulo, Ltd.	16—17	..	5 17 8
135,000	Stk.	Sept. 15	10	Sheffield A.	242—245	..	4 1 8
209,053	"	"	10	Do. B.	242—245	..	4 1 8
447,427	"	"	10	Do. C.	242—245	..	4 1 8
5,600,000	Stk.	Aug. 12	5½	South Metrop., 4 p.c. Ord.	145—148	+2	3 12 0
1,460,000	"	Jan. 13	3	Do. 3 p. c. Deb.	101—103	+1	2 18 3
60,000	Stk.	Aug. 31	12	Tottenham and Edmonton A.	280—290	..	4 2 9
60,000	"	"	9	Do. B.	200—210	..	4 5 9
182,380	10	Dec. 30	5	Tuscan, Ltd.	9½—10½	..	4 15 3
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	99—101	..	4 19 0
				WATER COMPANIES.			
746,184	Stk.	Dec. 30	11	Chelsea, Ord.	313—318	+3	3 9 2
150,000	"	"	5	Do. 5 p. c. Pref.	168—173	..	2 17 10
160,000	"	"	4½	Do. 4½ p. c. Pref. '75	150—155	+4	2 18 1
175,785	"	Sept. 29	4½	Do. 4½ p. c. Deb.	157—162	..	2 15 7
1,720,560	Stk.	Oct. 13	7	East London, Ord.	218—223	+3	3 2 9
654,740	"	Dec. 30	4½	Do. 4½ p. c. Deb.	157—160	..	2 16 3
890,000	"	"	3	Do. 3 p. c. Deb.	101—103	..	2 18 3
700,000	50	Dec. 15	7½	Grand Junction 10 p. c. max.	112—115	+1	3 5 3
310,000	Stk.	Sept. 29	4	Do. 4 p. c. Deb.	138—143	..	2 15 11
708,000	Stk.	Aug. 12	14	Kent	365—370	..	3 15 8
160,000	"	"	7	Do. New, 7 p. c. max.	212—217	..	3 4 6
1,043,800	100	Dec. 30	10½	Lambeth, 10 p. c. max.	297—302	+2	3 9 6
406,200	100	"	8	Do. 7½ p. c. max.	230—235	+5	3 8 1
350,000	Stk.	Sept. 29	4	Do. 4 p. c. Deb.	138—143	..	2 15 11
500,000	100	Aug. 12	13¼	New River, New Shares	435—440	+3	3 0 2
1,000,000	Stk.	Jan. 27	4	Do. 4 p. c. Deb.	137—142*	..	2 16 8
902,300	Stk.	June 29	7½	South-wark and Vauxhall Ord.	200—205	+3	3 13 2
126,500	100	"	7½		7½ p. c. max.	190—195	+7	3 16 11
489,200	Stk.	"	5		5 p. c. Pref.	168—171	..	2 18 6
1,019,585	"	Oct. 13	4		4 p. c. A Deb.	138—143	..	2 15 11
1,155,066	Stk.	Dec. 15	10	West Middlesex		300—305	+3	3 5 7
200,000	"	"	4½	Do. 4½ p. c. Deb.		160—163	..	2 15 3
200,000	"	Sept. 15	3	Do. 3 p. c. Deb.		102—105	..	2 17 2

* Ex div.

case stood at present, the Council must pay the costs of all the previous proceedings; and on going to the House of Lords, they would only incur the extra expense of that proceeding, while it was possible that the decision of the Court of Appeal might be upset. In this event, the Water Company would have to pay the whole of the costs. Having gone so far, he was of opinion they would not be doing right unless they took the case to the highest tribunal. If the House of Lords went against them, he should not be content to rest even there. His next proposal would be that they should endeavour to form as strong a combination of parishes as they could, get together the most influential deputation possible, and then go to the Home Secretary. Having a strong Government, they could point out to him that no private member had any chance of getting through the House of Commons a Bill to amend the Public Health Act; that parishes like Hampton stood to lose what was a crushing sum; and that the Government were in duty bound to alter the law. They must let it be known that they had made up their minds not to sit down quietly and submit to such an injustice as this. The motion was then adopted. The Clerk (Mr. F. A. Kent) stated that the total amount of the costs up to the present for both sides was £509; the other side totalling £146 13s. 7d., and the Council £362 6s. 8d., of which latter sum £283 16s. 8d. was for out-of-pocket expenses. Cheques were ordered to be drawn for £246 in part payment.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The anticipation of my informant on the Edinburgh and Leith Gas Commission regarding the adoption of Mr. Herring's report upon the new gas-works, was realized to the full last Monday. There was not a dissentient voice in the Gas Commission who met on that day. Not even an explanation was asked. Bailie Kinloch Anderson recommended the report in sentiments which were not pitched in too high a key, considering the circumstances. He was at some pains to defend the policy of sending out deputations, which he might almost have spared himself the trouble of, as only one member (Mr. Waterston) had any objection on that score. Mr. Waterston, however, quite coincided in Mr. Herring's report, and, indeed, seconded the motion for its adoption; expressing his gratitude to Mr. Herring for the assistance he had given him in the matter. Not only was the report adopted, but a formal vote of thanks was accorded to Mr. Herring, which everyone will agree he well deserved.

The Commissioners, at the same sitting, let the contract for the erection of the buildings to accommodate the plant for dealing with residual products in the new works to Messrs. John Waddell and Sons, of Edinburgh; the agreement being subject to the adjustment of some of the schedules. The contract price—£4730—was the lowest.

Bailie Kinloch Anderson reported that the total cost of taking down the old chimney shaft in the Edinburgh Gas-Works, including extras, amounted to £325. It was matter for congratulation, he said, that no accident occurred. They all acknowledged that the Contractor went about the work in a very careful manner.

It was reported that, following the decision of Sheriff Rutherfurd in the matter of the Diamond Jubilee donations to the Royal Infirmary of Edinburgh and the Leith Hospital, amounting to £315, these institutions had repaid the donations to the Commissioners, and that the incident was now closed. To this I suppose there is now no harm in my adding that the gentleman on whose behalf the objection to these donations was first taken was Mr. Andrew Usher, distiller and wine merchant in Edinburgh, who three years ago gave £100,000 to the Corporation of Edinburgh to assist in defraying the cost of erecting a Town Hall in the city. Mr. Usher died about four months ago; and he therefore did not see the successful termination, from his point of view, of the proceedings which he began. Neither did he witness his Town Hall scheme further advanced than the adoption of a site. This must have been a great disappointment to him. He was exceedingly anxious to see the hall erected during his lifetime; but the Corporation bungled in the matter of the selection of a site, and they are only now in Parliament seeking powers to acquire property on the spot they have agreed upon.

Two circumstances were reported, which may be placed in contrast to each other. It is almost a universal practice, under the feudal system which prevails in Scotland, that the superior (that is the person who gives off the feu) requires his vassal (the feuar) at stated periods, or upon the entry of a singular successor (a purchaser), to pay a casualty to him. This amounts, in recent times, to a duplicand of the feu-duty; formerly it was a year's rent. The Gas Commissioners acquired the gas-works by purchase, and are thus singular successors to the old Gas Companies. The Corporation of Edinburgh are superiors of part of the land on which the Edinburgh Gas-Works are erected; and they, in this capacity, demanded a year's rent as due to them under the singular succession. Payment could not be resisted, for there is no law which is more deeply rooted in the land than the feudal law; and the subject was placed in the hands of a surveyor to fix the amount due. This gentleman has reported the sum as £2853; and the Commissioners directed payment to be made. To this extent, therefore, the revenue of the Commission during the current year will be prejudicially affected. The other incident reported was that the Treasurer had borrowed £1600 at 2¾ per cent. to enable him to pay off a similar sum bearing interest at 3½ per cent. The amount saved is only £12 a year; but the incident shows how plenteous is money for investment in local undertakings. This is no doubt due to the recent allegations regarding company promotion; and thus what is to the community in general, a calamity, is to local boards really an advantage.

A further incident which the Commissioners had before them is of considerable importance. The proposal had been made that the Commissioners might combine with other Corporations or Companies in the making of gas-meters. The subject was considered by the Works Committee, who recommended the Commissioners to take no action upon it. In their opinion, the Commissioners have not the power to enter into any such a combination as was proposed. The Commissioners approved of the recommendation of the Committee. There will, therefore, be no Corporation meters.

The Engineer reported an increase in the output of gas during December, as compared with the same month of 1897, of over 8 million cubic

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28, BATH STREET.
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BIRMINGHAM:
1, OOZELLS STREET.
Telegraphic Address: "GOTHIC."

MANCHESTER:
87, BLACKFRIARS STREET.
Telegraphic Address: "GOTHIC."

WINTER SEASON 1898-9.

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feet, and a total increased output since May 16 of over 29½ million cubic feet. Mr. Kinnaird, of Leith, raised the question of the quality of the gas, regarding which the Chairman (Provost Bennet, of Leith) said there were great complaints. Bailie Kinloch Anderson explained that the last report by the Edinburgh City Analyst to the Town Council showed that they were making gas of 26·60-candle power, which was above the standard of from 24 to 26 candles. The Leith works were unequal to the demand upon them, and in consequence gas was being sent from Edinburgh to assist them. If there was anything wrong with the gas in Leith, it was want of pressure. This is, of course, the only explanation. It might have been expected that a Commissioner would have known this, and also that, whether he knew it or not, a public meeting of the Commission was not the place in which to first bring the matter forward. A question put in Committee would have served the same purpose. The effect of its being mentioned in public will be that a number of gas consumers will believe that Mr. Kinnaird is right, and that the gas is undoubtedly bad—which it is not. Thereby the business of the Commission will not be assisted, but hindered.

While I have no sympathy with a Gas Commissioner getting up a cry to the effect that the gas which is being supplied is inferior, I do not wonder that, in the recent atmospheric conditions, gas consumers should complain of the want of light. This has taken place in Glasgow. A writer in a newspaper on Wednesday said: "I am afraid that our Corporation have too many irons in the fire. Their attention should, in my opinion, be directed more to good-paying matters, over which they have the control, and in which the general body of the ratepayers are directly interested. I would refer now specially to the gas, the inadequacy of the supply of which at the present time, owing to the foggy weather and the extraordinary demand, is apparent to almost all, if not to the authorities themselves. Insufficient light is bad enough; but a gas-fire in this weather is a delusion and a snare. As the Corporation have induced many citizens to have these gas-fires, they are bound to provide the gas to heat them. It is a serious matter where such gas-fires are in bedrooms. In a case of this kind, in my own house, where an inmate is confined to bed, there is not sufficient heat; and we fear injury may be the result. If the Convener of the Gas Committee would see to this matter, he would earn the gratitude of all interested." This Rip Van Winkle must have been asleep if he is not aware that for the past two or three years the Corporation of Glasgow have been on the outlook for a new site for gas-works, and have only now been able to secure a suitable one. No one is more conscious than those in charge of the gas supply, that the plant under their control is not sufficient to enable them to cope as they would wish with the extraordinary demand which occurs during foggy weather in winter.

Mr. W. Foulis, Engineer to the Glasgow Corporation Gas Department, has been interviewed as to his experience during the fog of last week. Friday was the worst day. On that day, the total quantity of gas sent out was 32 million cubic feet, which was 7 million cubic feet above the normal consumption. On Saturday, the output was 28 million cubic feet; and it would have been much larger but for the fact of factories having been closed in the afternoon. On Monday, with business resumed, but with the fog much lighter, the output was again 28 millions. The total cost of the extra gas consumed in the two days will, when leakage and discount are taken into account, amount to nearly £10,000. This is what gas consumers in Glasgow will have to pay for the fog.

The Dumfries Gas Commissioners on Thursday had before them a recommendation by the Gas Committee to borrow £12,500, at 3 per cent. interest, from the Dumfries Savings Bank, wherewith to pay off the second half of a loan of £25,000 which they borrowed twenty years ago for extensions at the gas-works. The sum so borrowed will be paid off in twenty equal instalments, of principal and interest, of £839 7s. 2d. each. The interest on the original loan was at the rate of 4½ per cent. A break was allowed at the end of twenty years, which has been taken advantage of, and by which the Commissioners will save £156 a year. Bailie Currie, in moving the adoption of the recommendation, said that if it were agreed to, the Commission would be, at the end of twenty years, in the position of owing only £4365. Some discussion took place as to whether they should repay the loan in twenty or thirty years. One side thought that to pay it up in twenty years would be to then hand over to their successors property of the value of £60,000 free of debt; and that they should rather extend the payments over the longer period, whereby they might be able to reduce the price of gas by at least 1d. per 1000 cubic feet. The other side thought that, in view of the uncertainty as to what electricity might develop into—one member, in particular, saying he had heard of an electric lamp coming out which, with the same amount of current, would give three times the amount of light—the loan should be paid up as soon as possible. By a majority of one the Commissioners resolved to make the repayments in twenty years. It did not transpire, though the question was asked, who it is who is endeavouring to obtain an entirely free Sunday every week for the employees in the gas-works. Bailie Currie stated that some years ago the Manager gave the men every alternate Sunday; but that, on their days off, the men, dressed in their best, went to the works and sat in the retort-house, looking at the other men working. When he remonstrated with them on the subject, the men said they would rather be in the gas-works than walking about. The Manager also tried them with a six-hour shift; but they would not have it. He would continue to give them every alternate Sunday, if the men would take advantage of it; but the men were quite satisfied with the hours they were working. It was also stated that it would cost £200 a year to let the men off every Sunday. The Commissioners resolved to do nothing in the matter.

Mr. J. Kincaid, who is at this time taking up the duties of Manager to the Falkirk Gas Commission, has been entertained to supper by his friends in Peterhead, prior to his leaving the town. At the gathering, there was read a letter from Provost Smith, who holds the position of Convener of the Gas Committee, in which he said that no man knew better than an unskilled Convener what it was to have a thoroughly capable, reliable, and conscientious Manager at his side; and he had had this experience in the case of Mr. Kincaid. A speaker mentioned that since he went to Peterhead, Mr. Kincaid had reduced the price of gas by between 30 and 40 per cent.; and he anticipated that, if he were as successful at Falkirk as he had been at Peterhead, he would have a brilliant career. Such a handsome send-off must be exceedingly encouraging to a young Manager.

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N.B.—Engineers and Managers are very heartily welcomed at the New Conveyor Company's Works to inspect the Smethwick Conveyors.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 4.

Sulphate of Ammonia.—Throughout the week the market has been very quiet, and prices have declined; the closing quotations, delivered f.o.b. at the ports, being £10 3s. 9d. to £10 6s. 3d. per ton. There has been a marked absence of interest on the part of consumers, whose ideas have been below current quotations. The large makers have been engaged in delivering on contracts, and have had very little ready stuff to offer. But the smaller makes have been available; and these have been disposed of at declining prices. No business of importance in the forward position has transpired; and, buyers being indifferent, quotations are mainly nominal.

Nitrate of Soda is quiet, but steady at 7s. 6d. per cwt. for ordinary, up to 7s. 7½d. per cwt. for fine, quality.

LONDON, *Feb.* 4.

Tar Products.—Large transactions in pitch is the leading characteristic of this week's business. The continuous rise in the value of fuel in all its forms has probably something to do with the important contracts for pitch which are not only being made for prompt but for forward delivery. The demand for pitch also, for American account, is undoubtedly increasing; and this comparatively new outlet, together with the enlarging consumption in Westphalia, is sure to reflect itself on the immediate future value of pitch. Benzols show a little more life, and sales are reported in the Provinces at an advance of at least ½d. per gallon. There is no improvement, however, in the value of any form of benzol for export. It is gratifying to know that the home consumption is largely increasing. Again there are inquiries for anthracene; and buyers would doubtless be wise to purchase at the present low prices, although it is doubtful if any substantial quantity can be obtained at the quotations marked below. As one important tar distiller observed on 'Change a day or two ago: "It runs into no money, and is worth holding." There is a steady market for creosote and naphthas. Carbolic acid is easier and naphthalene is reported a little stronger. The low prices realized for tar in London is the subject of much comment; but this tar is notoriously of very inferior quality, when compared with the country production.

The average quotations for the week are: Tar, 13s. to 19s. Pitch, east coast, 24s. 6d.; west coast, 22s. 3d. Benzols, 90's and 50's, 8d. Toluol, 1s. Solvent naphtha, 1s. 1½d. Heavy naphtha, 1s. 2d. Crude, 30 per cent., naphtha, 3¼d. (naked). Creosote, 3d. Heavy oils, 55s. Carbolic acid, 60's, 1s. 11d. Creosote salts, 40s. Anthracene, nominal, "A," 4d.; "B," 2¾d.

Sulphate of Ammonia.—This market is being talked down; but "bear" operators have only been successful in moving it in certain quarters two or three shillings. To-day's average value is £10 5s., less 3½ per cent. at all ports.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—No material change can be reported in the position of the coal trade of this district. The cold weather is keeping up an active inquiry for all descriptions of house-fire coal. Prices are exceedingly firm at the full list rates; averaging 12s. to 12s. 6d. per ton at the pit for best Wigan Arley, 10s. 6d. to 11s. for Pemberton four-feet and seconds Arley, and 9s. 6d. to 10s. for common house-fire qualities. Fuel for general manufacturing purposes is in brisk inland demand, with, if anything, rather a shortness of supplies; and prices are strong at 8s. 6d. to 9s. per ton at the pit for ordinary steam and forge coal. For shipment, there has also been more business coming forward, with better prices obtainable; good qualities of steam coal, delivered at the ports on the Mersey, fetching from 10s. to 10s. 6d. per ton. For engine classes of fuel, there is a continued pressing demand; and though supplies from outside districts come forward at lower prices than Lancashire colliery owners are quoting, these are not in sufficient quantity to bring any surplus upon the market. Local colliery owners have more inquiry for slack than they are prepared to entertain; most of the principal firms, in fact, having nothing to offer in the open market, all their output going away to meet the requirements of their regular customers. Prices, if anything, tend here and there to harden, but are without really quotable change. Common slack averages from 4s. 9d. to 5s. per ton at the pit, medium 5s. 3d. to 5s. 9d., and best 6s. 3d. to 6s. 9d.

Northern Coal Trade.—An active demand is experienced for nearly all classes of coal; and with a full production, the range of prices is high. Best Northumbrian steam coals are quoted at from 10s. 6d. to 10s. 9d. per ton f.o.b. for early delivery; but for delivery over the shipping season, a higher price is asked. In steam smalls, there is a fair demand at from 4s. 3d. to 4s. 6d. per ton. In the gas coal trade, there are heavy deliveries on old contracts, and a fair sale of additional quantities. The price is well maintained, and may be quoted as from 8s. 6d. to 9s. per ton f.o.b. for single cargoes; while contracts are found to vary very greatly in price, though about 8s. 3d. per ton f.o.b. is an average quotation. The large output of gas coke is well taken up; and there is this week no alteration in the price.

[Referring to the Copenhagen gas coal contract in last week's number, our correspondent mentioned that the tenders had been allotted at an advance of about 9d. per ton on last year's quotations. We have since learnt that the figures at which tenders were accepted really showed an advance of 1s. 9d. per ton on the price c.i.f. Copenhagen.—ED. J.G.L.]

Scotch Coal Trade.—Trade continues in a healthy condition, notwithstanding that this is the dull season of the year. Forward contracting is becoming more common than it has been for some months, one reason for which is the appearance of a movement among the miners for an advance of wages. This is in accordance with the resolution which was adopted at the recent Edinburgh conference of the Federation. The miners, except in Fifeshire, appear to be following in only a half-hearted manner the

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advice to press for higher wages. In Fifeshire, the formal request has been made to the coalmasters to grant an advance of 12 per cent. There is trouble among the miners in Fifeshire on account of the breaking away of some of them from the eight-hour day, which they have enjoyed for more than a quarter of a century. The explanation given is that some pits have been opened up in Fifeshire by west country coal companies, who have brought men with them to work their mines; and that the men, finding they could not earn so much per week working eight hours a day as they did in the West, have broken the Fifeshire rule. The attempt is therefore being made to obtain an abnormally large rise in Fifeshire, with a view to inducing the malcontents to conform to the eight-hour day. The prices quoted are: Main, 9s. per ton f.o.b. Glasgow; ell, 9s. 6d. to 10s.; and splint, 9s. 9d. to 10s. The shipments for the week amounted to 154,887 tons—a decrease of 7095 tons (which is attributable to foggy weather) upon the previous week, and of 77 tons upon the corresponding week of last year. For the year to date, the total shipments have amounted to 496,145 tons—a decrease upon the same period of last year of 43,460 tons.

Workmen's Compensation at Manchester.—The Manchester City Council, at a meeting last Wednesday, authorized the payment of £300 to the widow of a workman named Shaw, who recently lost his life by an accident at the Corporation gas-works. This is the maximum sum allowed by the Act.

Plymouth Safe from Water Famine.—The Burrator Reservoir, which was completed in September last by the Plymouth Corporation on the borders of Dartmoor, is now full. It has taken four months to accomplish this; the earlier accumulation of water having been once or twice run off in order to clear it of the *débris* brought down by the first winter floods. The storage capacity of the reservoir is 651 million gallons; and its construction, at a cost of £150,000, under the joint supervision of Mr. J. Mansergh and Mr. E. Sandeman (the Corporation Water Engineer), has ensured to Plymouth an uninterrupted supply of pure water for the next half century.

Stockport Water-Works Purchase Question.—The Stockport Town Council last Wednesday adopted a minute of the Finance Committee, deciding that £3000 should be placed at the disposal of the Water Purchase Committee for costs in connection with the proposed acquisition of the water undertaking and parliamentary proceedings. A protest was made against the Council granting the Committee such a large sum without first having the details of the expenditure before them. The ratepayers of Alderley Edge, Wilmslow, Marple, and Bredbury and Romiley have authorized their respective Authorities to oppose the Corporation Bill—mainly for the purpose of securing better terms in regard to the supply of their districts.

The Dangers of "Dead-Ends" of Water-Mains.—Some trouble arose a short time ago in regard to a sample of the Grand Junction Company's water, taken from a main terminating in a "dead-end," being pronounced by the Public Analyst as unfit for drinking purposes. Dr. Orme Dudfield has called attention to the matter in his monthly report on the sanitary state of the Kensington district; his remarks being as follows: "There can, I think, be no reasonable doubt that danger to the public health is involved in circumstances which tend to slow the flow of water, whether by actual dead-ends of mains or under conditions analogous. The Engineer stated that the Company were, and for some time past had been, engaged in abolishing dead-ends. It is to be hoped that the recent stir will have the desired effect of stimulating their activity in this direction. Quite recently Sir Edward Frankland has had occasion to direct attention to the ill-effects of dead-ends of mains, in a report on the water supply at Paisley, where an epidemic of enteric fever was probably due to a gross defect in the apparatus for flushing dead-ends."

The Derwent Valley Water Bills.—At the meeting of the Water Committee of the Sheffield City Council last Wednesday, the Sub-Committee in charge of the Derwent Bill reported that, in fulfilment of the pledge given to the City Council, they had conferred with, and taken the advice of, the Counsel, Engineers, and Parliamentary Agents retained on behalf of the Bill; and their unanimous opinion was that the Bill was right and proper, and that the Council should go forward with it without hesitation, and with all the influences that could be brought to bear in its behalf. The Sub-Committee, therefore, recommended that such advice be acted upon, and asked for the authorization of the Water Committee and the City Council accordingly. On the same day, the Mayor of Leicester (Mr. Alderman Clifton) presided at a town's meeting to consider the Bills of the Sheffield and Derby Corporations. There was a small but representative attendance. On the motion of the Mayor, seconded by Alderman Wood, the Chairman of the Water Committee, it was unanimously decided to employ Counsel, obtain witnesses, and take other steps to oppose both measures. At a special meeting of the Town Council the previous evening, it had been decided to adopt the same course; and the formal resolutions were added.

The Fylde Water-Works Purchase.—An extraordinary meeting of the shareholders of the Fylde Water Company was held last Thursday to consider the new Bill with respect to the agreement come to between the Company and the Fylde Water Board for the purchase of the undertaking. Mr. Albert Simpson presided. Mr. W. J. Dickson, Solicitor, read the different heads of the Bill, and explained that it was necessary for Parliament to sanction the terms of purchase and transfer. The stock proposed to be issued was 2¾ per cent. Mr. W. Bradley proposed the necessary resolution sanctioning the Bill; and it was carried, and the meeting terminated. Our readers may remember that the acquisition of the Company's works by the Local Authorities of Blackpool, Fleetwood, Lytham, and St. Anne's has been under consideration for some years, and last session a Bill was passed to acquire the works by arbitration. But an amicable settlement has been arrived at, whereby the shareholders will continue their holdings; being credited with the present market value of the stock, for which they will be paid interest at 2¾ per cent. The concern is at the present time in an exceedingly flourishing condition, and upon a capital of about £400,000 has paid dividends of 10, 7, and 4 per cent. for some years. The purchase price of the undertaking is about £800,000.

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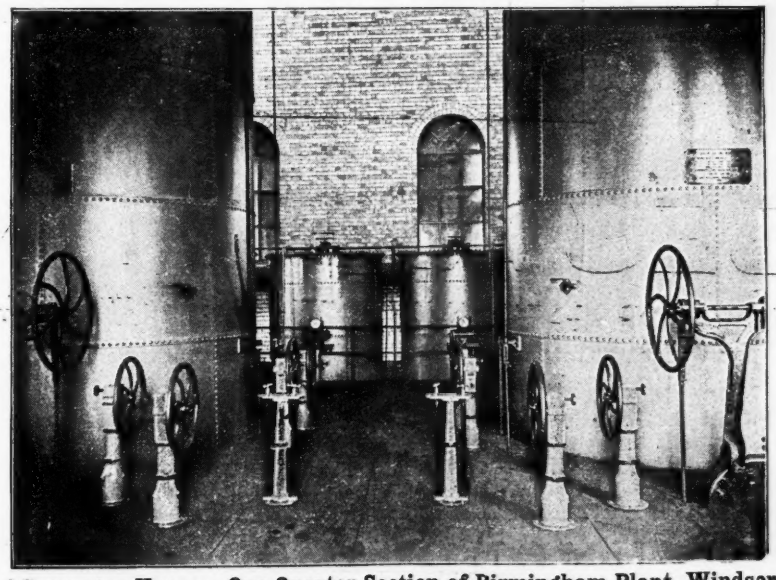

RESULTS PROVE EFFICIENCY.

Working Floor of Generator House. One Quarter Section of Birmingham Plant, Windsor Street Station.

The Maximum Daily Capacity of the Birmingham Corporation's Plant, which was erected by this Company, is 10 MILLION CUBIC FEET.

Twopenny Rate for Broken Lamps.—At a meeting of the Llanelly Borough Council last week an extraordinary state of affairs was disclosed by the Clerk. He stated that the police report for the month showed that 25 per cent. of the public lamps had been wilfully broken; and some of the districts were in darkness on this account. The Council were now paying at the rate of £300 a year to repair lamps wilfully damaged; and this was equivalent to a twopenny rate for six months.

Fatality at the Sheffield Gas-Works.—A labourer named Naylor, employed on the night shift at the Neepsend works of the Sheffield Gas Company, met with his death last Thursday under peculiar circumstances. He was late in going to his duties on Wednesday night, and instead of entering the works at the gate, made his way along the railway line. In doing so he fell down a coal-shoot, rendering himself partially insensible; he then staggered on for about 20 yards, when he had a second fall, and was found on Thursday morning, quite dead. At the Coroner's inquiry on Friday, the Jury stated in their verdict that "deceased was found dead, having accidentally fallen down a coal-shoot, being a trespasser at the time."

Fatal Escape of Gas at Stalybridge.—An extensive escape of gas, and an explosion, attended with fatal consequences, occurred at Stalybridge last Sunday morning. Mr. Joseph Marsden, a coal merchant, residing with his wife and family in Elgin Street, was roused by his dog scratching at the bed room door, and gurgling as if choking. Mr. Marsden got up and found the house full of gas. The dog was gasping, the canary was dead in its cage, and the child was unconscious. An alarm was given, and shortly afterwards a terrific explosion occurred on the ground floor of the adjoining house. The windows were blown into the street, the door was ripped from the casement, and the windows of several houses were shattered to fragments. The tenant, James Rigby, was discovered lying across the hearth in his bedroom, asphyxiated, his wife, son, and daughter being found unconscious, in which condition they remained for several hours. The internal fittings and furniture were a total wreck. The leakage, it is stated, was due to a crack in the gas-main running in front of Rigby's house.

Acetylene Explosions.—Details were made known on Saturday of a serious explosion of acetylene gas which occurred last Thursday night at the brick-works of Messrs. C. J. Sanders and Co., near Chesterfield, by which Mr. W. F. Richmond, of the firm of Messrs. Richmond, Stockton, and Co., Limited, and a workman were injured. It appears that for the purpose of working night shifts a large acetylene gas-making plant was being installed by Messrs. Richmond and Co. On Thursday night, an explosion occurred within the gasholder, which was blown up with great violence, tearing away in its course the whole of the roof and ironwork above. Mr. Richmond and a workman were buried beneath the ruins, sustaining injuries to the head and shoulders, not, however, of a serious nature. The accident was a remarkable one, as the gasholder was believed to have been emptied as far as practicable. John Betts, a miner, employed at the Netherscale Colliery, near Burton-on-Trent, was killed last Tuesday by an explosion of acetylene. The roof of the building containing the gas plant was blown off, and the place wrecked.

The Market for Sulphate of Ammonia in New York during the Past Year.—According to a report on the New York chemical market in the past year which appears in the "Chemical Trade Journal," sulphate of ammonia was sold in January on a basis of 25 per cent. at $2 32c. to $2 55c. From February to June prices fluctuated widely for ammoniacal liquor; being $2 35c. to $2 65c. July opened with $2 47½c. to $2 50c. quoted; and by August the foreign market grew stronger, and a sympathetic rise in price was experienced—liquor being quoted at $2 55c. to $2 57½c. In September the price went up to $2 60c. to $2 62½c.; but as the month closed there were offerings at $2 55c. to $2 57½c. The first shipment of liquor was made from the Semet-Solvay bye-products coke-ovens at Ensley (Ala.) in September, amounting to 11,000 gallons, which went to Syracuse (N.Y.). At the close of December, sulphate produced from gas liquor sold at $2 65c. to $2 67½c. The prices are from 25c. to 35c. higher than for 1897. A large increase in the production of sulphate of ammonia is expected in the current year, as several coke-oven plants are being built to recover the bye-products.

Messrs. Biggs, Wall, and Co. have received an order for 100 tons of cast-iron pipes for South America.

A large contract has been secured by Mr. Gilbert Little for his latest design of "Smethwick" conveyors for the Cwm Neol Coal and Coke Works, South Wales.

The Hessle Gas Company have accepted the tender of Messrs. R. Dempster and Sons, Limited, of Elland, for taking down one of their existing gasholders, 50 feet in diameter, and replacing it with a new telescopic holder.

A Local Government Board inquiry was held on Tuesday at Weston-super-Mare relative to an application by the District Council for sanction to borrow £1055. The money, it was explained, is required for laying mains through certain new streets.

The ratepayers of Skipton last Wednesday consented to the District Council opposing the Bill which has been promoted by the Gas Company for further powers. As readers are aware, the Council have deposited a Bill to empower them to purchase the Company's undertaking.

In previous issues of the "Journal," reference has been made to the well-arranged stand of the South African Lighting Association at the Grahamstown Industrial and Arts Exhibition, the incandescent gas-lights at which recently did such excellent service when the electric light failed. We learn from the Manager of the Association (Mr. W. Arnott) that they have been awarded a gold medal for their exhibit of incandescent gas-burners, stoves, and gas appliances.

The Hampstead Vestry have decided to appoint a delegate to confer with the Joint Committee of Clerkenwell, St. Luke's, and Holborn on the question of the Parliamentary Inquiry as to Gas Companies' charges; and also, subject to the opinion of Counsel being in favour of the power of the Vestry to legally expend money for the purpose, to contribute a sum not exceeding £200 towards the cost of obtaining evidence and appearing before the Committee of the House of Commons on the matter.

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3rd. If there was a reply, what word most wittily describes that reply?

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The British Fire-Prevention Committee, started by the efforts of Mr. E. O. Sachs, have just completed a testing-station close to the St. John's Wood Railway Station. The work to be carried on therein will be the testing of fire-resisting materials, methods of construction, and appliances. The station is fitted with a gas-generating plant, and it works very satisfactorily with a small consumption of ordinary "nuts." The pipe installation is by Messrs. Laidlaw and Co., of Glasgow.

At the Auction Mart, Tokenhouse Yard, E.C., to-morrow, Mr. Alfred Richards will, as already announced in our columns, offer for public competition, by order of the Directors, a large quantity of debenture and other stock of The Gaslight and Coke Company. The sale will comprise £2405 of 3 per cent. consolidated debenture stock, £2285 of 4 per cent. consolidated preference stock, £6360 of ordinary stock, and a large issue of £150,000 of 3 per cent. consolidated perpetual debenture stock, under the Company's Act of last year. This stock bears interest in priority over the dividends on all the preference, maximum, and ordinary stocks of the Company.

Since Messrs. Willey and Co.'s new works, at St. Thomas, Exeter, have been in operation, a steam syren has been used for summoning the workpeople. Objection was taken to it by some residents in the neighbourhood; and the firm's attention was called to the fact that the permission of the Local Authority for its use ought to have been obtained. Formal application for this permission was made to the St. Thomas District Council last Wednesday. One member of this body expressed the opinion that it was very narrow-minded of any person to throw an obstacle in the way of a large and growing industry like that of Messrs. Willey, and said he thought Exeter would be better off if it had the sound of more syrens. Another member remarked that what was complained of was not a discordant "hooter," but a syren with a musical note. The required permission was unanimously given.

The tender of the New Conveyor Company, Limited, of Smethwick, has been accepted by the Gas Committee of the Birmingham Corporation for the automatic coal-handling machinery for the large installation of inclined retorts at the Saltley Gas-Works. The plant will be erected in accordance with the drawings of Mr. H. Hack. The Company's tenders have also been accepted for the plant at Burslem, Swansea, and Stretford, to be erected under the supervision of Mr. H. Peaty, Mr. Thornton Andrews, and Mr. H. Kendrick, the Engineers; also for a coal and coke handling plant at the Stockholm Gas-Works. We are informed that the Company began the present year with orders on their books of more value than the whole of the work executed in 1898; and they are now making considerable extensions of their workshops and plant to enable the Managing-Director (Mr. Gilbert Little) to cope with the increased business.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

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[For Illustrated Advertisement, see p. 338.]

HUTCHINSON BROTHERS, Gas Engineers, &c., Falcon Works, Barnsley, Makers of Wet and Dry Gas-Meters, Brass-Work, and general Gas Apparatus, Lead Saturators, Tanks, &c., Tools, and Gas-Works Sundries. (See p. 276, last week's issue.)
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Six 6-inch H, DIP, and ASCENSION PIPES.
For Price, apply to W. Palgrave Brown, Gorleston and Southtown Gas Company, Great Yarmouth.

TWO Purifiers for Sale, 11 ft. by 10 ft. by 4 ft. 6 in. deep inside, 24 in. by 6 in. Lutes. Worked by two 12-inch Four-Way Valves, with Covers and Lifting Apparatus. Faced Flanges, and in good condition. Also 12-inch CENTRE-VALVE to dispose of. To be seen at work at Morecambe.
Apply to R. Dempster and Sons, Limited, Elland.

FOR SALE, by Private Treaty—A complete WATER GAS PLANT (Loomis System), two GASHOLDERS, SCRUBBERS, &c. Also a Quantity of CAST-IRON PIPES and VALVES.
For full Particulars and permission to inspect, apply, by letter, to No. 3204, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. Blakeley, Gas Engineer, Ravensthorpe, Yorks.

FOR SALE, cheap—
Two PURIFIERS, 8 ft. square by 4 ft. deep.
Two " 5 ft. " 4 ft. "
One " 5 ft. " 3 ft. "
One EXHAUSTER, 20,000 Cubic Feet per hour.
Two " 5000 " " "
Also CONDENSERS, SCRUBBERS, WASHERS, GASHOLDERS and TANKS, VALVES, &c., &c.
Apply to Saml. While and Son, 60, Queen Victoria Street, London, E.C.

GAS Plant for Sale, and cheap to clear—
RETORT IRONWORK—Several good Sets complete.
6-inch Vertical PIPE CONDENSER.
Four Wrought-Iron ANNULAR CONDENSERS, 32 in. by 18 ft. (Five Years old).
TOWER SCRUBBERS, One, 5½ ft. by 12 ft.; One, 8 ft. by 12 ft.; One, 5 ft. by 40 ft.
EXHAUSTERS, with ENGINES, from 2000 to 30,000 cubic feet per hour, guaranteed in working order.
PURIFIERS—Sets of 6 ft., 7 ft., 8 ft., & 12 ft. square.
STATION METERS, 6,00, 10,000, 25,000 ft. per hour.
6-inch STATION GOVERNOR.
RACK and SCREW VALVES—Four-Way, Six-Way, and Centre Valves in Stock.
STORAGE TANKS for Tar and Liquor.
Address J. Firth Blakeley and Co., Ravensthorpe, Dewsbury.

URBAN DISTRICT COUNCIL OF SMETHWICK GAS-WORKS.

COKE-HANDLING PLANT.

THE Gas Committee are prepared to receive TENDERS, with Specification and Drawings, for a COKE-HANDLING PLANT for dealing with the Coke produced at their Gas-Works.
Further Information may be obtained from Mr. B. W. Smith, at the Gas-Works, Rabone Lane, Smethwick.
The Committee do not bind themselves to accept the lowest or any Tender.
Tenders, endorsed "Coke-Handling Plant," addressed to the Chairman of the Gas Committee, to be delivered to the undersigned not later than the 21st inst.
By order,
W. J. Sturges,
Secretary.
Gas Offices, Public Buildings,
Smethwick, Feb. 1, 1899.

LIVERPOOL UNITED GASLIGHT COMPANY.

TAR.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the TAR produced at their several Works for a period of One Year from July 1, 1899.
The quantities of Tar produced per annum are estimated to be as follows; but the same cannot be guaranteed, and may be more or less:—

At the Athol Street Works, about		720,000	gallons.
" Eccles Street	"	530,000	"
" Caryl Street	"	480,000	"
" Wavertree	"	560,000	"
" Linacre	"	2,400,000	"
" Garston	"	350,000	"

The Tenders may be for the whole, or for one or more of the Works separately, or for a definite quantity from any specific Works.
Forms of Tender and full Particulars may be obtained on application to the undersigned.
Tenders, sealed and endorsed "Tender for Tar," are to be delivered here not later than the 18th of February, 1899.
The Directors reserve to themselves the right to accept any Tender in part or in whole, and do not bind themselves to accept the highest or any Tender.
By order,
William King,
Engineer.
Gas Office, Duke Street, Liverpool,
Jan. 26, 1899.

ROTHERHAM CORPORATION.
(Gas Department.)

THE Gas Committee of the above Corporation are prepared to receive TENDERS for the supply, delivery, and erection of a COKE CRUSHING, ELEVATING, and SCREENING PLANT, capable of dealing with 50 Tons of Coke per day of Eight Hours.
Tenders (with which Drawings must be enclosed) to be delivered to the undersigned on or before Thursday, Feb. 9.
Frank A. Winstanley,
Engineer and Manager.

COUNTY BOROUGH OF BURNLEY.

TO PIPEFOUNDERS.

THE Gas Committee of the Corporation of Burnley are prepared to receive TENDERS for the supply of about 330 Tons of CAST-IRON PIPES.
Specifications and Forms of Tender may be obtained on application to the undersigned.
Tenders, endorsed "Tender for Gas-Mains," to be sent in, addressed the Chairman of the Gas Committee, Town Clerk's Office, Town Hall, Burnley, on or before Wednesday, the 22nd of February, 1899.
Jno. P. Leather,
Gas Engineer.
Gas-Works, Burnley,
Jan. 31, 1899.

TO COLLIERY PROPRIETORS.

THE Corporation of Haverfordwest invite TENDERS for the supply of about 1400 Tons of (double-screened) WIGAN, ARLEY, or SILKSTONE GAS COAL of the very best quality, to be delivered at the Gas-Works Quay, in quantities as required by the Gas Manager, during the Year commencing on the 25th of March next. Water communication.
Tenders by Feb. 23.
Forms and further Particulars of,
R. T. P. Williams,
Town Clerk.
Council Chamber, Haverfordwest,
Jan. 27, 1899.

LEIGH URBAN DISTRICT COUNCIL.
(Gas Department.)

THE Gas Committee of the above Council are prepared to receive TENDERS for the purchase of a SOLID-LEAD SATURATOR and DRAINER.
Copies of the Specification and Forms of Tender may be obtained (on application) from the Engineer, Mr. John Foster, Gas-Works, Leigh.
Sealed Tenders, endorsed "Tender for Saturator," must be sent in to me, the undersigned, before Twelve o'clock noon, on Saturday, the 18th day of February, 1899.
By order,
Peregrine Thomas,
Clerk and Solicitor.
Town Hall, Leigh, Lancs.,
Feb. 1, 1899.

BOROUGH OF NELSON.
(Gas Department.)

THE Gas Committee of the above Corporation invite TENDERS for the supply and erection of a GAS CONDENSER at their Brierfield Gas-Works.
Plans may be seen, and copies of the Specification, Form of Tender, and further Particulars may be obtained at the Office of the Engineer, Mr. William Foster, Nelson, Lancashire.
Sealed Tenders, endorsed "Tender for Condenser," to be sent to my Office not later than Twelve o'clock noon on Tuesday, the 14th day of February, 1899.
The Committee do not bind themselves to accept the lowest or any Tender.
By order,
R. M. Prescott,
Town Clerk.
Town Hall, Nelson,
Jan. 25, 1899.

COLNEY HATCH GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Company's Offices, New Southgate, on Thursday, the 23rd of February inst., at Five o'clock in the Evening precisely, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 31st of December, 1898, to declare Dividends, to elect Directors, to appoint an Auditor, and for other Purposes.
By order,
Ernest L. Burton,
Secretary.
Secretary's Office: 5, Great Winchester Street,
London, E.C., Feb 2, 1899.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

SALE OF ORDINARY STOCK.

NOTICE is Hereby Given, that the Directors have instructed Mr. ROBERT MACK, Auctioneer, to SELL BY AUCTION, at the Offices of the Company, Grainger Street West, Newcastle-upon-Tyne, on Wednesday, the 22nd day of February, 1899, at Half-Past Twelve o'clock in the afternoon, TWENTY-FIVE THOUSAND POUNDS ORDINARY STOCK of the NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY, being part of the moneys authorized to be raised by the Newcastle-upon-Tyne and Gateshead Gas Act, 1896.
For Conditions of Sale and further Particulars, apply to the undersigned.
Thos. Waddom,
Secretary.
Offices: 35, Grainger Street West,
Newcastle-upon-Tyne, Feb. 1, 1899.

COLNE VALLEY WATER COMPANY.

NOTICE is Hereby Given, that it is the intention of the Directors of the above Company to SELL BY TENDER 300 NEW ORDINARY SHARES of £10 each, and 850 PREFERENCE SHARES of £10 each.
Minimum Prices: £16 per New Ordinary Share, and £13 per Preference Share.
Particulars, with Forms of Tender, can be obtained at the Company's Office; and Tenders must be sent in on or before the 16th of February, 1899.
Wm. Verini,
Secretary.
Office: Bushey, Watford,
Feb. 1, 1899.

HORNSEY GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of this Company will be held at the Offices of the Company, No. 63, Chancery Lane, in the County of Middlesex, on Friday, the 24th day of February, 1899, at Half-past Three o'clock in the afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 31st of December last, to declare Dividends, to elect two Directors and an Auditor, and to transact the Ordinary Business of a General Meeting.
The TRANSFER BOOKS WILL BE CLOSED from the 9th to the 24th of February, both inclusive.
By order of the Board,
S. J. Williams,
Secretary.
Offices: 63, Chancery Lane,
London, W.C., Feb. 3, 1899.

MITCHAM AND WIMBLEDON DISTRICT GASLIGHT COMPANY.
(Incorporated by Act of Parliament, 1857.)

NOTICE is Hereby Given, that the SIXTY-FOURTH ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of this Company will be held in the Board-Room, at the Works, Mitcham, in the County of Surrey, on Tuesday, the 28th day of February, 1899, at Three o'clock in the Afternoon precisely, to receive the Report of the Directors and a Statement of the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in place of those retiring by rotation, and for General Business.
The TRANSFER BOOKS WILL BE CLOSED from the 13th inst. until after the Meeting.
By order,
Benjamin Green,
Secretary and Manager.
Offices and Works: Western Road,
Mitcham.

RIDDINGS DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY MEETING of the Shareholders of the above Company will be held at the Offices of the Company, No. 30, Gracechurch Street, in the City of London, on Friday, the 24th day of February, 1899, at Three o'clock in the Afternoon, to receive the Report of the Directors and the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect a Director and an Auditor in the place of those retiring by rotation, and to transact the General Business of the Company.
The TRANSFER BOOKS WILL BE CLOSED from the 11th to the 24th inst., both inclusive.
By order of the Board,
Alfred Lass,
Secretary.
Offices: 30, Gracechurch Street,
London, Feb. 3, 1899.

BARNET DISTRICT GAS AND WATER COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the above Company will be held at the Albion Tavern, Aldersgate Street in the City of London, on Friday, the 24th day of February, 1899, at Half-past Twelve o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts for the Half Year ended the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in the place of those retiring by rotation, to consider and determine as to the grant of a retiring allowance to Mr. Alfred Lass on his resignation of the office of Secretary and Accountant to the Company, and to transact the General Business of the Company.
The TRANSFER BOOKS WILL BE CLOSED from the 11th to the 24th of February, both inclusive.
By order of the Board,
Ernest W. Drew,
Secretary *pro. tem.*
Offices: 30, Gracechurch Street,
London, Feb. 3, 1899.

BOURNEMOUTH GAS AND WATER COMPANY.

SALE BY TENDER OF 500 "B" SHARES.
In Pursuance of the Provisions of the Bournemouth Gas and Water Act, 1878.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company to SELL BY TENDER 500 "B" SHARES of £10 each (the Dividend on which is limited to 7 per cent.), to be paid up in full on or before the 31st of May, 1899.
Particulars and Conditions of Tender may be obtained at the Company's Office, Bournemouth; or of the Secretary, as under.
Sealed Tenders must be sent to the Secretary not later than Eleven o'clock on Friday morning, the 24th of February, 1899.
By order,
William Cash,
Secretary.
London: 90, Cannon Street, E.C.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held MONTHLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by Auction of Gas and Water Stocks and Shares under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. Alfred Richards's Offices, 18, FINSBURY CIRCUS, E.C.

By order of the Directors.

£150,000 OF THREE PER CENT. CONSOLIDATED DEBENTURE STOCK OF THE GASLIGHT AND COKE COMPANY.

To be issued under the provisions of The Gaslight and Coke Company's Act, 1876, and The Gaslight and Coke Company's (Capital Consolidation) Act, 1898.

This Stock is a PERPETUAL DEBENTURE STOCK, bearing Interest in priority over the Dividends on all the Preference, Maximum, and Ordinary Stocks of the Company, and offers an

INVESTMENT OF THE SOUNDEST CHARACTER.

MR. ALFRED RICHARDS will Sell THE ABOVE BY AUCTION, at the Mart, Tokenhouse Yard, E.C., on Wednesday, Feb. 8, 1899, at Two o'clock precisely, in Lots.

Particulars and Conditions of Sale may be obtained of the SECRETARY AND GENERAL MANAGER of the Company, at the Company's Offices, Horseferry Road, WESTMINSTER, S.W.; and of Mr. ALFRED RICHARDS, Auctioneer, 18, FINSBURY CIRCUS, E.C.

By order of the Directors.

DEBENTURE, PREFERENCE AND ORDINARY STOCKS OF THE GASLIGHT AND COKE COMPANY.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, Tokenhouse Yard, London, E.C., on Wednesday, Feb. 8, 1899, at Two o'clock precisely, in Lots—

£2405 OF THREE PER CENT. CONSOLIDATED DEBENTURE STOCK,

£2285 OF FOUR PER CENT. CONSOLIDATED PREFERENCE STOCK,

AND

£6830 OF ORDINARY STOCK

OF

THE GASLIGHT AND COKE COMPANY,

to be issued under the Provisions of The Gaslight and Coke Company's (Capital Consolidation) Act, 1898, and offering

INVESTMENTS OF THE HIGHEST CLASS.

Particulars and Conditions of Sale may be obtained of the SECRETARY AND GENERAL MANAGER of the Company, at the Company's Offices, Horseferry Road, WESTMINSTER, S.W.; and of Mr. ALFRED RICHARDS, Auctioneer, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the Plymouth and Stonehouse Gaslight and Coke Company, the Directors of the Hornsey Gas Company, the Directors of the Chigwell, Loughton, and Woodford Gas Company, and other Owners.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, London, E.C., on Tuesday, Feb. 28, at Two o'clock—

PLYMOUTH AND STONEHOUSE GASLIGHT AND COKE COMPANY (by Order of the Directors).—£10,000 of ORDINARY STOCK.

HORNSEY GAS COMPANY (by Order of the Directors).—£5676 of FOUR PER CENT. PERPETUAL DEBENTURE STOCK,

CHIGWELL, LOUGHTON, and WOODFORD GAS COMPANY (by Order of the Directors).—200 £10 SHARES; Also

STOCKS AND SHARES in the PORTSEA ISLAND GAS COMPANY, the WANDSWORTH & PUTNEY GAS COMPANY, and the WEST HAM GAS COMPANY.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

Price 6s., Cloth Bound,

THE CHEMISTRY OF ILLUMINATING GAS.

By N. H. HUMPHRYS, Assoc M.Inst.C.E., F.C.S.

LONDON: Walter King, 11, Bolt Court, Fleet St., E.C.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY, LIMITED,

NEWBATTLE COLLIERIES,

DALKEITH, N.B.

THE Acetylene Illuminating Company, Limited, 63, Queen Victoria Street, London, E.C., GIVE NOTICE that they hold the BRITISH PATENT RIGHTS for the MANUFACTURE OF CALCIUM CARBIDE by means of the electric furnace, that they are bringing an action against the Midland Acetylene (Parent) Syndicate, Limited, to restrain them from so manufacturing that product, and that they intend in the future to bring actions against all infringers of these Patents and all purchasers or users of Carbide of Calcium made in infringement of the same.

NOTICE.

THE Acetylene Illuminating Company, Limited, having published and issued an advertisement or circular claiming that they hold the British Patents for the Manufacture of Calcium Carbide by means of the Electric Furnace, we guarantee to indemnify anyone who buys Carbide from us against any claim by "The Acetylene Illuminating Company, Limited," or anyone else.

READ HOLLIDAY AND SONS, LIMITED, Acetylene Gas Engineers and Carbide of Calcium Manufacturers, HUDDERSFIELD.

NOTICE.

THE Acetylene Illuminating Company, Limited, having published and issued an advertisement or circular claiming that they hold the British Patents for the Manufacture of Calcium Carbide by means of the Electric Furnace, we guarantee to indemnify anyone who buys Carbide from us against any claim by "The Acetylene Illuminating Company, Limited," or anyone else.

TINKER AND HOLLIDAY, LIMITED, Carbide of Calcium Manufacturers, HAZELHEAD, SHEFFIELD.

ENRICH YOUR GAS WITH CHEAP BENZOL.

AT to-day's Price of Benzol, Illuminating POWER costs less than ONE-THIRD OF A PENNY PER CANDLE.

Apply to SADLER & CO., MIDDLESBROUGH.

DISPENSE WITH CANNEL COAL and INCREASE YOUR ILLUMINATING POWER by using the

WHESSOE-MUNICH BENZOL CARBURETTER

The Cheapest and Best in the Market.

The Managers of Tynemouth, Middlesbrough, and Darlington Gas-Works are much pleased with it, and would not be without it.

Apply to the Sole Makers

THE WHESSOE FOUNDRY COMPANY, LIMITED, DARLINGTON.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY. RAVENSTHORPE, NEAR DEWSBURY.

NOW READY.

Price, Bound in Cloth, 5s. 6d., Post Free.

— SIXTEENTH YEAR —

THE COMPLETE REPORTS OF PROCEEDINGS OF THE DISTRICT ASSOCIATIONS OF GAS ENGINEERS & MANAGERS OF THE UNITED KINGDOM FOR 1898.

The Fifteen previous Volumes are still on Sale.

LONDON:

WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

BENZOL.

SPECIALLY prepared for Enriching Gas and PREVENTING THE STOPPAGE OF SERVICE-PIPES by the deposit of Naphthalene. Price 10d. per Gallon, free on rails at our Works in Drums (returnable).

Apply WHITWOOD CHEMICAL CO., Ltd., WHITWOOD COLLIERIES, Nr. NORMANTON.

TUBES AND FITTINGS

ALL KINDS

WRITE FOR PRICES

STAFFORDSHIRE TUBE Co, BIRMINGHAM.

ARMSTRONG'S PATENT

CANDLE SAFETY LAMPS

Are a great improvement on Oil, giving a good Light, requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

48, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

LONDONDERRY GAS COALS

FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,

COUNTY OF DURHAM.

Available Output up to 5000 Tons per day.

Yield of Gas 11,000 cubic feet per Ton of Coal as per Analysis by

Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,

SEAHAM HARBOUR, COUNTY OF DURHAM.

THOMAS TURTON AND SONS, LIMITED,

SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

LONDON OFFICE:

90, CANNON STREET, E.C.

HEBBURN MAIN GAS COALS.

Yield of Gas per Ton . . 10,500 Cubic Feet.
Illuminating Power . . . 16·4 Candles.
Coke . . . . . 68 per Cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

The Wallsend & Hebburn Coal Company, Ltd.

B Lombard Street,
NEWCASTLE-ON-TYNE.

W. RICHARDSON, Fitter.

COKE-BREAKERS,

PRICES REDUCED.

(THOMAS & SOMERVILLE'S PATENT)

With Elevators and Conveyors worked by Steam or Gas Engine.

GEORGE WALLER & CO.,
165, QUEEN VICTORIA STREET, E.C.
And at STROUD, GLOUCESTERSHIRE.

HOLMSIDE GAS COALS.

Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton . . . 11,205 Cubic Feet.
Illuminating Power $16\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality) $13\frac{3}{4}$ Cwt. per Ton.
Sulphur . . . . . A little over 1 per Cent.
Ash . . . . . Under 1 per Cent.
Tar . . . . . 163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor 103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

Present Daily Produce available 3000 Tons.

Of equal quality to the "Holmside" Coal, and also very largely used by many Gas Companies at Home and Abroad.

Both descriptions are shipped at Tyne Docks, and Dunston Staiths, River Tyne, also at North and South Docks, Sunderland.

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,
HOLMSIDE & SOUTH MOOR OFFICES,
NEWCASTLE-UPON-TYNE.

EVESON FOR CANNEL

TELEGRAMS: "EVESON, BIRMINGHAM."

PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

BOLDON GAS COALS.

ANALYSIS.

Yield of Gas per Ton. . 10,500 Cubic Feet.
Illuminating Power . . 16·9 Candles.
Coke . . . . . 66·7 Coke.
Sulphur . . . . . 0·86 Sulphur.
Ash . . . . . 2·04 Ash.

For Prices, &c., apply to
W. H. PARKINSON,
THE HARTON COAL CO., LTD.,
NEWCASTLE-ON-TYNE.

Telegraphic Address: "PARKINSON, NEWCASTLE."

THORNLEY GAS COALS

WORKED BY THE
WEARDALE IRON & COAL Co., Ld.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON, *May 28, 1895*

Yield of Gas per Ton . . 10,500 Cub. Ft.
Illuminating Power . . . 16·9 Candles.
Coke (of good quality) . . 67·5 per Cent.
Sulphur . . . . . 0·58 ,,
Ash . . . . . 2·73 ,,

For Price, &c., apply to the
WEARDALE IRON & COAL Co., Ld.
QUAYSIDE, NEWCASTLE-ON-TYNE.

INCANDESCENT GAS LIGHTING.

Incandescent Burners from **5/6 per doz.**

Specially annealed best Fireproof Glass Chimneys (equal to the Jena). } 1/4 per Doz.

All other Incandescent Fittings at greatly reduced Prices.

Patentees of the "IMPROVED STANDARD GLOBE-CHIMNEY."

Best "Comet" Bulbs, 3s. per Dozen.

Write for Illustrated Price Lists.

WHOLESALE FITTINGS COMPANY,
80, COMMERCIAL ROAD, LONDON, E.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE BOGHEAD CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles
Coke per ton . . . . . 1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 17·8 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,
COAL OWNERS, NEWCASTLE-ON-TYNE;
OR
E. FOSTER & CO.,
21, JOHN STREET, ADELPHI, LONDON, W.C.

CAUTION! CAUTION! CAUTION!

INCANDESCENT GAS LIGHTING.

ALL DEALERS AND THE PUBLIC ARE

CAUTIONED AGAINST BUYING, SELLING, OR USING EITHER OF THE FOLLOWING MANTLES:—

"SUNLIGHT" COMPANY'S WHITE MANTLES.
"DAYLIGHT" COMPANY'S WHITE MANTLES.

ACTIONS FOR INFRINGEMENT OF PATENT HAVE BEEN COMMENCED by the WELSBACH INCANDESCENT GAS-LIGHT COMPANY, Ltd., against both the above Companies for Infringement of Patent by the **MANUFACTURE AND SALE** of the above White Mantles.

USERS ARE EQUALLY LIABLE WITH DEALERS.

THE WELSBACH INCANDESCENT GAS-LIGHT CO., LD., YORK ST., WESTMINSTER.

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 34, OLD BROAD STREET, E.C.

MANUFACTURERS: MAJOR & CO., Ltd.
BENZOL FOR ENRICHING GAS
HULL AND WOLVERHAMPTON.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and Yield of Gas.
Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.
CHESTERFIELD.

HARRIS & PEARSON,
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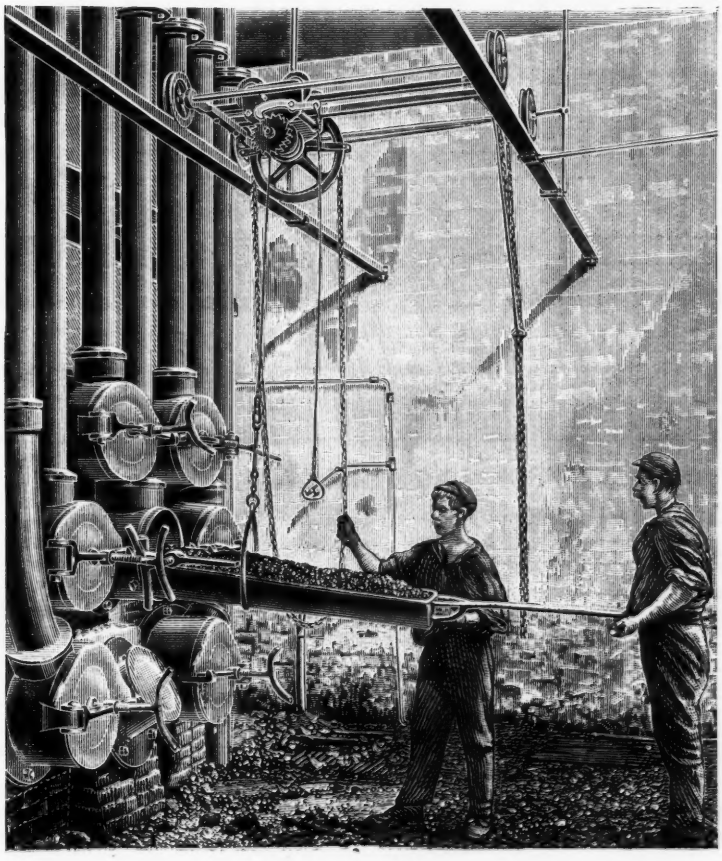

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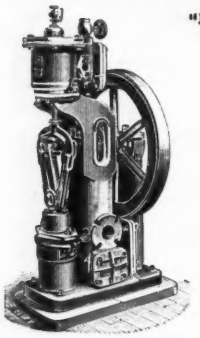

Fig. 705. "SINGLE RAM" STEAM-PUMP.

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

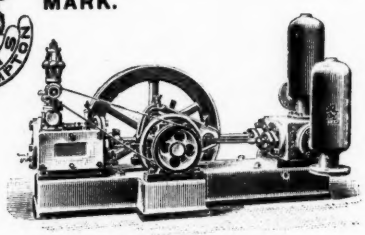

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

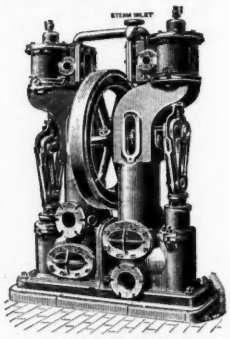

Fig. 713 "DOUBLE-RAM" STEAM-PUMP.

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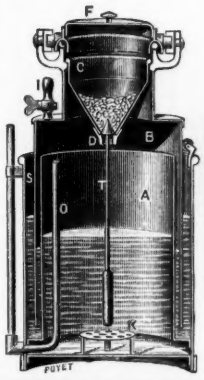

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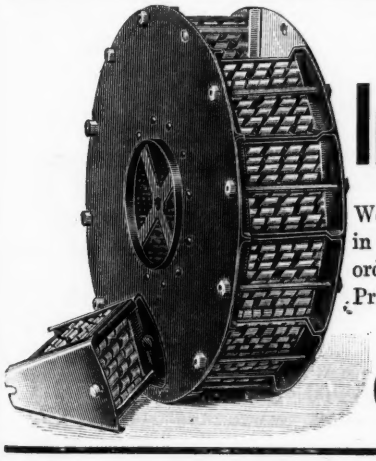

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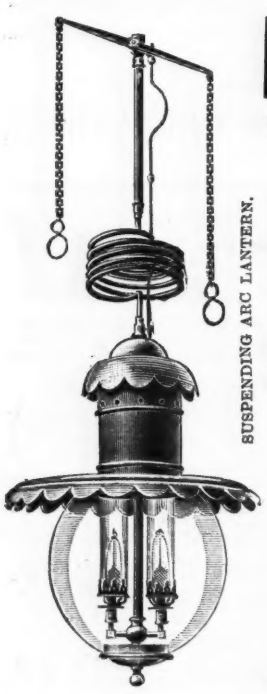

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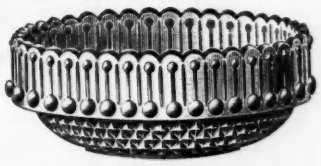

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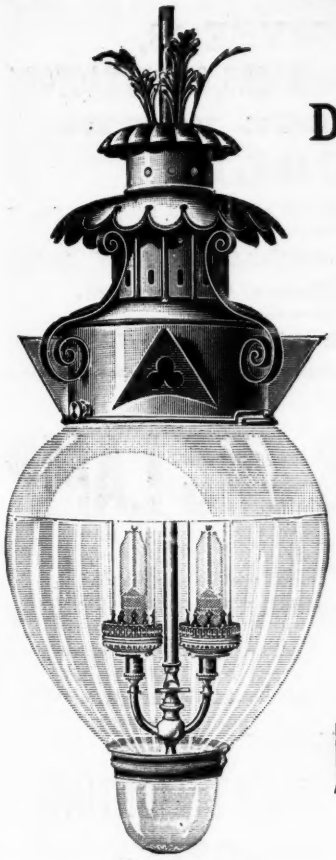

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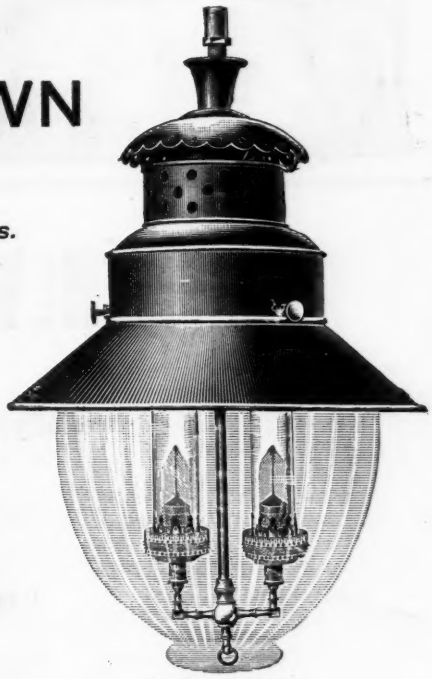

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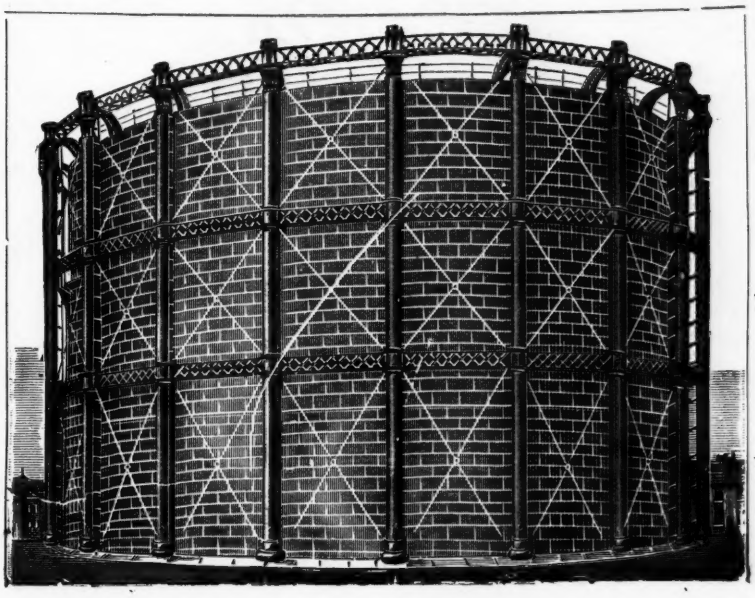

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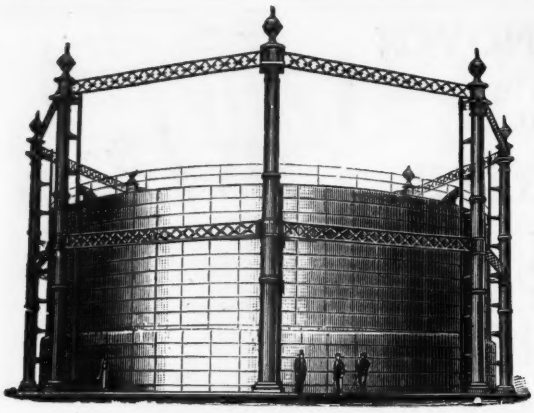

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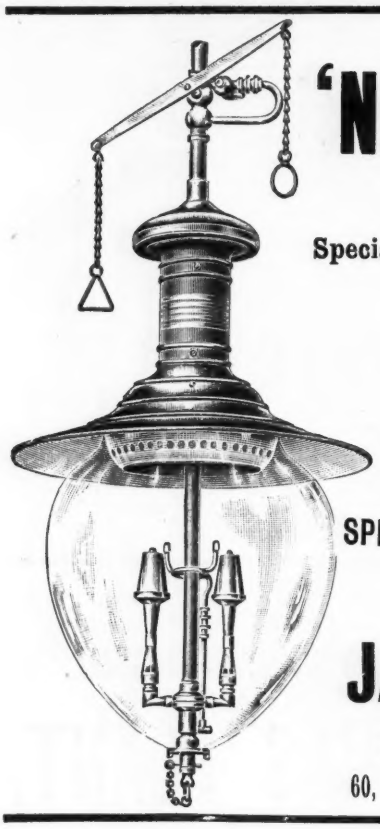

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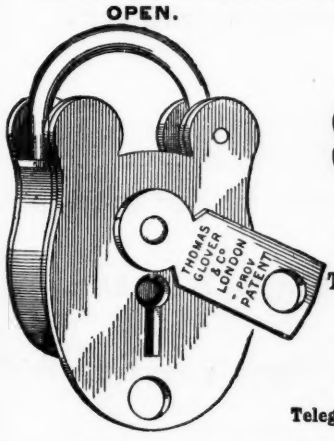

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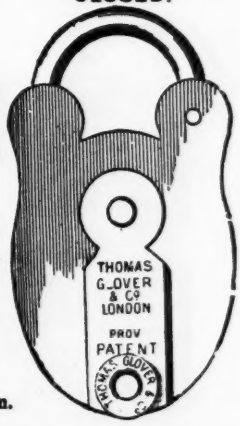

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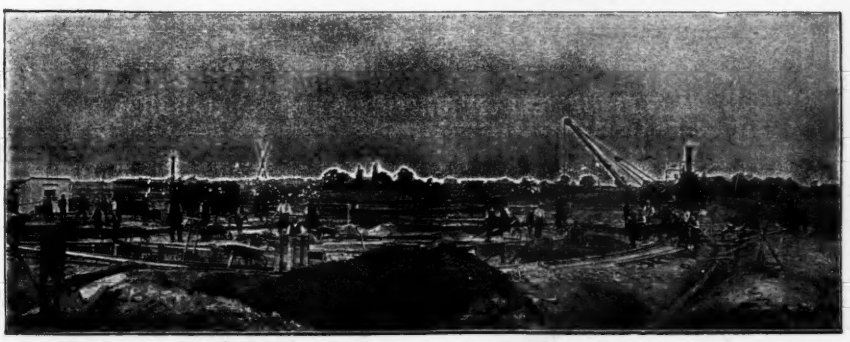

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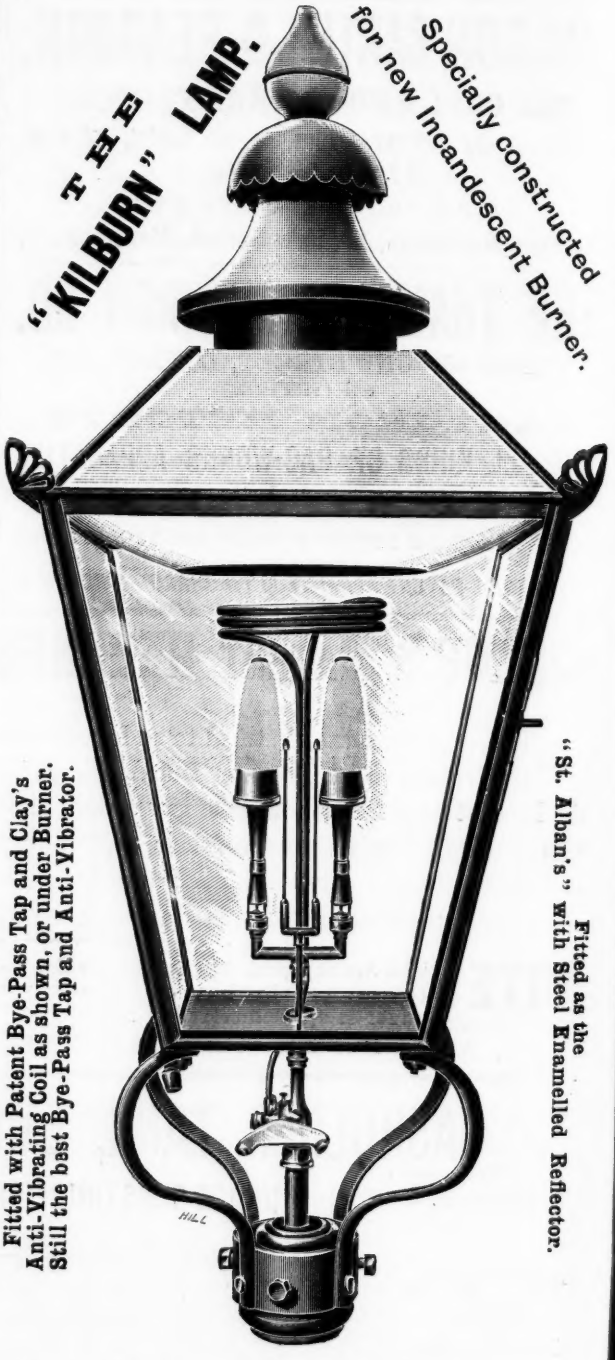

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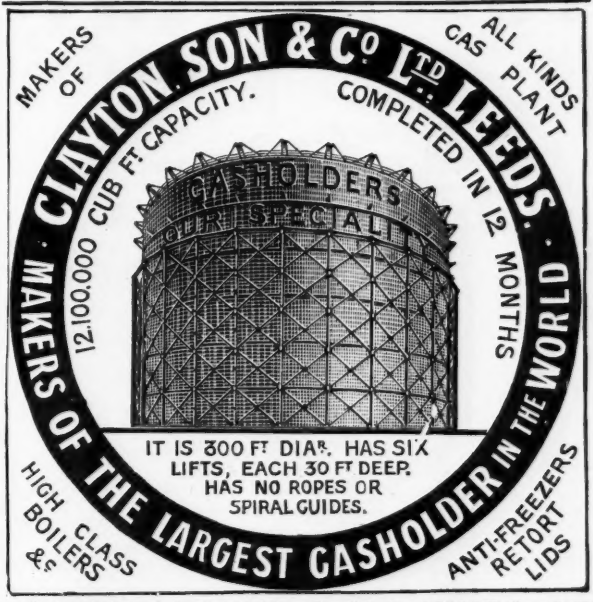
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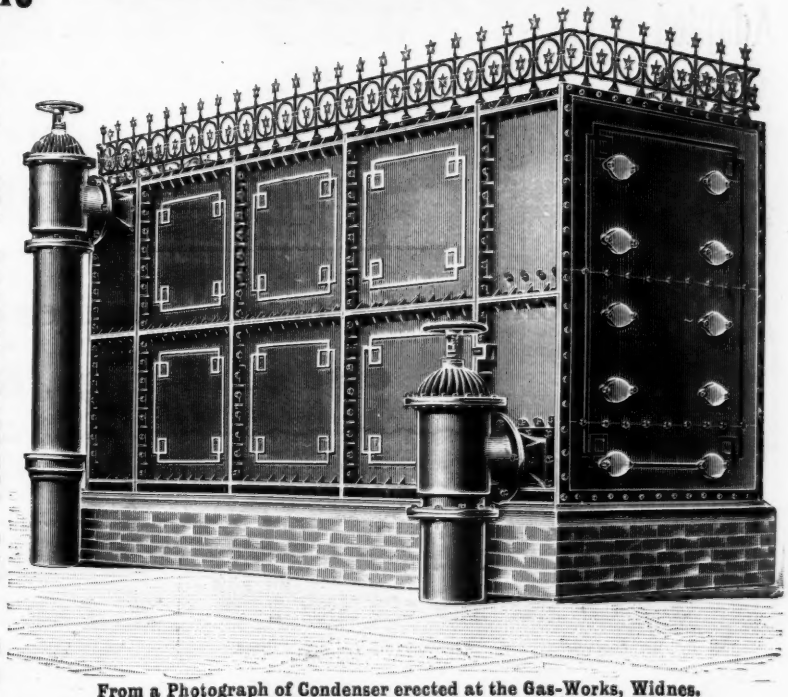
Water being the cooling medium, the temperature of the gas can be kept under control better than with air; and the gas can be sent forward to the purifying plant at the proper temperature for efficient and economical purification.

The cold water enters at the bottom, and gradually rises to the top as the water absorbs heat, thus causing the warm gas to meet the warm water first, and to leave the Condenser in contact with water at any desired temperature by simply regulating the feed-water tap. The gas is thus **cooled progressively, uniformly, and effectually.** The simple construction of this Condenser affords a large cubical capacity, so that the gas remains in a considerable time, and secures all the advantage due to slow-speed condensation. Every part of the Condenser is easily accessible, and by removing the end plates the whole of the interior can be got at. It can be erected under cover, and protected from extremes of heat or cold.

R. & J. DEMPSTER, LTD., recommend this Condenser to be used as a Finishing Condenser, after the gas has already passed through the ordinary Annular or Air Condensers.

Condensers of this type equal to 10,500,000 cubic feet per 24 hours already erected and at work.



From a Photograph of Condenser erected at the Gas-Works, Widnes. Capacity 1,500,000 cubic feet per 24 hours.

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[See also Advt. p. 292.

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